

Solent Papers No.3

Fort Nelson

and the

Portsdown Forts



Garry Mitchell

with Peter Cobb



Above: Fort Nelson redan and barrack block viewed from the rear of the fort



Left: Fort Nelson North caponier

Below: Fort Nelson West rampart with 64pr R.M.L.

Bottom Left: Fort Nelson ditch
Bottom Right: Fort Nelson East rampart



Solent Papers Number Three Fort Nelson and the Portsdown Forts

Written and illustrated by Garry Mitchell
with additional information by Peter Cobb and David Moore



Above: Fort Nelson in 1979

Dedicated to the memory of the late Arthur and Olive McGrath of Allcot Road, Copnor, Portsmouth

Acknowledgements

The author would like to thank the following for their help in the production of this book: Major J.T.Hancock and Miss E. Norris, Institute of Royal Engineers, Corps library, Chatham; Brigadier J.T.Lewendon, Royal Artillery Institution, Woolwich; The late Arthur Corney, former Keeper Emeritus, Portsmouth City Museums Department; The Keeper of Public Records and staff of the Public Record Office, Kew; W.T. Casson, English Heritage, Plans Room, Fortress house, London; Michael Chapman, Librarian, War Office Library, Whitehall; The Imperial War Museum; Mrs. K. Gunns, Library, Admiralty Research Establishment, Portsdown; Second Officer J.Ross WRNS, H.M.S. Dryad; Mrs S. Bell Property Services Agency, Portsmouth; Councillor P. Ashley and Mrs. Iris Ives, Portsmouth Youth Activities Centre, Fort Purbrook; Nicholas Hall, Curator, Havant Museum; Hampshire County Library service, Portsmouth Central Library, Local History section; Hampshire County Record Office, Winchester; Portsmouth City Record Office; Public Libraries at Brixton, Bromley, Croydon, Westminster and West Wickham; Douglas Key; Peter Rogers, Norman Jenkins and Peter Cobb, whose help and encouragement was greatly appreciated.

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Titles in the Solent Papers Series

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This book first published by Gary Mitchell 1987 as ISBN 0 947606 07 X

Second edition republished by David Moore 1988 as ISBN 0 947605 08 8

Third updated edition republished by David Moore 2015 as ISBN 0 9513234 5 8

This new 2024 edition is published by the Palmerston Forts Society as a pdf document

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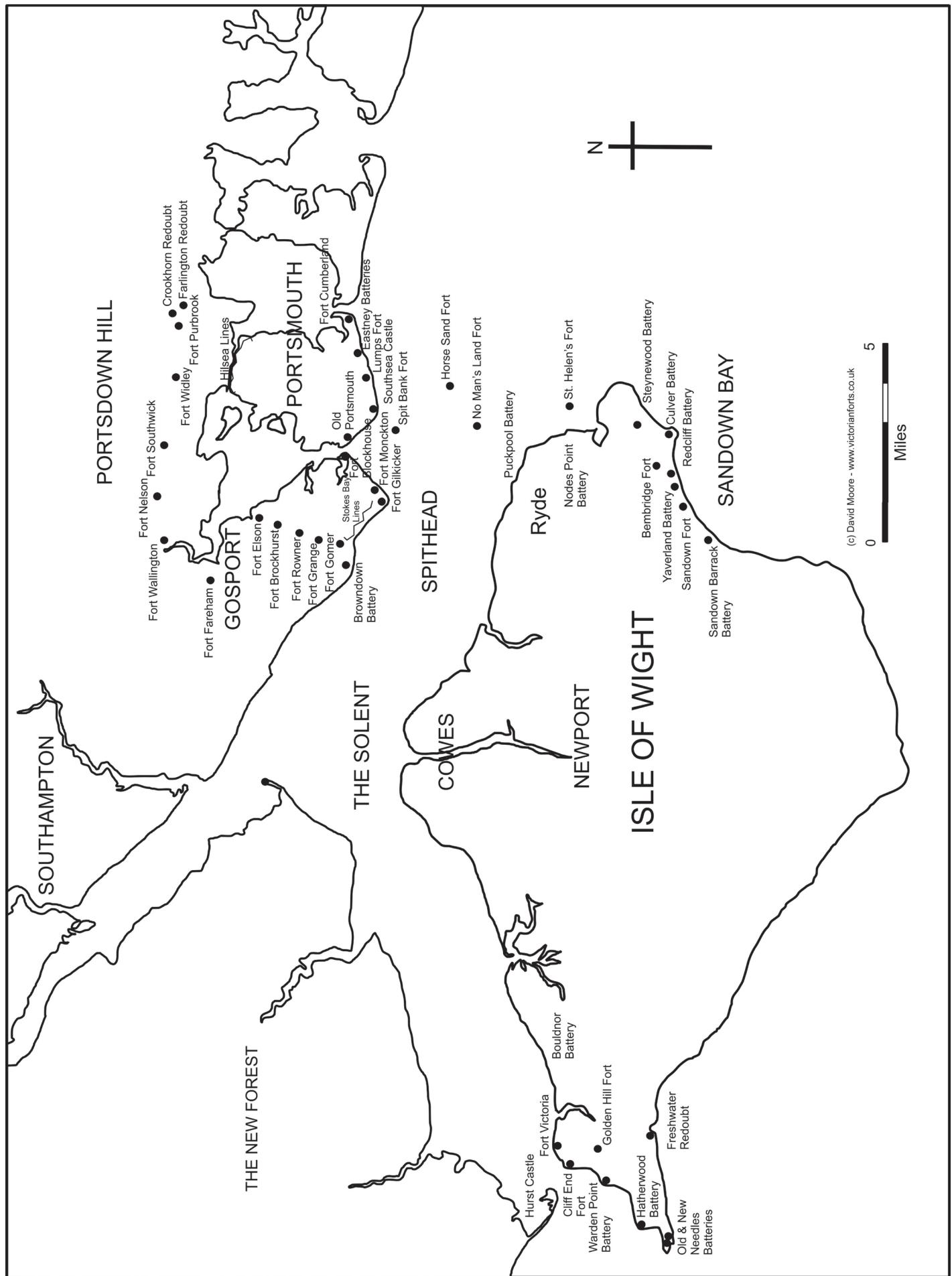


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History

The Portsdown Hill forts were built in the 1860's to protect Portsmouth dockyard and the naval installation from bombardment by rifled guns. From the hill, the whole of Portsea Island and its surroundings may be seen and it was feared that an enemy could, with suitable weapons, seriously damage the naval base.

Portsmouth had probably been fortified as far back as the 14th century when the French landed and burnt the town and a plan dated 1540, shows a circuit of walls and towers. On each side of the harbour entrance, stone blockhouses were constructed and a successor to one of these, the Round Tower, in Old Portsmouth, still stands. King Henry VIII caused Southsea Castle to be built as part of a wider scheme of coastal defence and a bridgehead fort was constructed at Portsbridge, at the same time. The Dutch engineer, Bernard de Gomme, remodelled Portsmouth's defences and built new fortifications at Gosport in the 17th century. Further work was carried out by the Board of Ordnance under Desmaretz , in the 18th century, including the reconstruction of the bridgehead fort at Portsbridge, in 1746. During the Seven Years War, in 1756, the first Hilsea Lines were constructed, again by Desmaretz. Further land was acquired in 1813, but no new works were built during the Napoleonic period.

From 1815, defence works were allowed to decay but in 1848 a revolution in France had overthrown the monarchy, a republic was proclaimed and Louis Napoleon, nephew of the Emperor, became its President. Not content with this, he staged a coup d'état and declared himself, Napoleon III in 1852. Britain was greatly alarmed by these events and was fearful of the motives and ambitions of the new Emperor, to the extent that attention was focussed on improving the country's defences. Forts Elson and Gomer in Gosport date from this period but the panic subsided before any other works were provided.

A temporary alliance was formed with France to oppose Russia's threat to the Turkish Empire and an expeditionary force was sent to the Crimea, where despite initial successes, the naval base of Sebastopol could not be taken. The allies were kept at bay by a few permanent forts, supplemented by rudimentary field works for nearly two years and when Sebastopol was finally taken and burnt, Russia agreed to discuss peace terms. The success and subsequent failure of the defence was to influence military thinking when it came to

considering what should be done for Britain's arsenals and dockyards.

On the conclusion of peace, mistrust of France returned and when she launched her first ironclad Gloire ; there was a feeling that Britain would lose control of the sea, or at least the English channel. There was renewed interest in the construction of modern fortifications to protect vulnerable areas and the Inspector General of Fortifications, General Burgoyne caused his assistant, Colonel W.F.D.Jervois, to re-examine the defences of the naval arsenals and dockyards. In his report of 1857 for 'Completing the defences of Portsmouth' he recommended a line of three forts between Forts Gomer and Elson, the reconstruction of the Hilsea Lines and further works along the sea front. Construction of these works began in 1858, but at the same time, the British army accepted Sir William Armstrong Co.'s rifled breech-loading gun into service. With its long range, improved accuracy and allegedly greater firepower, it caused the plans for new defence works to be reconsidered. If the French landed in England with similar weapons, they could emplace batteries on Portsdown Hill and bombard the dockyard, a distance of some 8000 yards and observe the fall of shot with ease. The new Hilsea Lines were not far enough out to prevent this and Portsdown Hill would have to be defended, in order to deny it to an enemy.

The chalk ridge which extended for seven miles would require a whole army to defend it, and this was impracticable. Instead, Jervois suggested that a continuous ditch should be dug along the top of the hill, with caponiers every half mile and that the Hilsea Lines, then under construction, should be discontinued. Such was the alarm in the country, that the Prime Minister Lord Palmerston, was obliged to call for a Royal Commission, to examine the question of the country's defence. His name has become synonymous with the Commission's forts, however and generations of Portsmouth people have come to know them as 'Palmerston's Folly'.

The Commissioner's report stated that a defence of the whole coastline was impracticable, but that important harbours should be defended and for Portsmouth they recommended a line of seven detached works on Portsdown Hill, the five major works being situated near Crookhorn (Ft. Purbrook), Widley Mill (Ft. Widley), the Fir Clump (Ft. Southwick), Nelson's monument (Ft. Nelson), and above Wallington village (Ft Wallington),

each about 2000 yards apart. Between Crookhorn, Widley Mill, and Fir Clump, two smaller works were proposed and a continuous line would link all the forts and extend down to the harbours on either flank. A further line of forts would be built between Fareham and the Solent on the Gosport peninsula, Newgate (Ft. Fareham), Roome and Lee farm. The Hilsea Lines would be retained, except for the deletion of certain ancillary works, as it was considered vital to prevent the enemy from landing on Portsea Island. To counter attacks by ironclad warships, five granite sea forts would be constructed on the shoals at Spithead to command the anchorage. When the report was presented to Parliament, a number of items had been deleted to reduce the costs, these were the intermediate forts on Portsdown Hill, Roome and Lee farm works at Gosport and two of the sea forts. The continuous line would not be built on Portsdown but redoubts would be constructed to cover the eastern and north-eastern approaches to Portsmouth, Crookhorn, Farlington and one, which is termed Langston' in this book, since it was never built nor officially named.

The government financed the construction of the new works by a series of terminable loans and building started in 1861. The lands were acquired and the contract for the works put out to tender. Each year new monies had to be voted, costs increased, as costs always do and it became increasingly difficult to persuade parliament to release sufficient funds to complete the forts and the last one was not finished until 1872. The long construction period of the Portsdown Forts and other works became a target for speculation in 1868, when reporters from the "St Pauls Magazine" and "The Times" visited the area and no doubt sensing the making of a public scandal, wrote the following "...Nor can it be denied that nothing is more to be deprecated than that either Southwick, Widley or Nelson (the three central forts on Portsdown Hill) ... should ever be tested by the rough and unmasking experience of war. No one can gaze into the deep chalk ditches which surround the Portsdown Hill forts without seeing that the scarp walls are already gliding in great slices into the ditch, and without imagining what would be the fate of the whole structure if a rapid and angry fire were sustained from 600 pounder guns standing upon the elevated terreplein for Forts Widley or Nelson. As to the miserably weak caponiers (sic) which flank these deep-cut chalk ditches, it will be sufficient to say that they belong to a system already as obsolete as the 68-pounder bore guns which

these forts were originally intended to carry". Similar sentiments were expressed about the Gosport forts and the Hilsea position and not surprisingly, this caused questions to be raised in Parliament. Shortly after this, the Secretary of War ordered an enquiry into the state of all defence works then in progress and in due course, the Committee produced their findings. Generally there was satisfaction expressed as to the progress of the Portsdown forts and apart from the difficulties with Wallington which was known about, the military authorities were cleared of any blame. Having been built, they remained unarmed until the mid-1880's, when gradually they were equipped with armament. By 1895, fixed landward-facing defences were no longer in favour and in 1903 they were declared obsolete and totally disarmed. From this time they were used as barracks mostly for the Royal Garrison Artillery and the magazines used to store ammunition for field artillery. Married quarters and stables were added for their new role and during the First World War, they helped to accommodate the Portsmouth garrison which at times reached 25,000 men.

Between the wars, the forts continued to be used as barracks, Fort Widley being occupied by Survey Companies of the Royal Engineers and in 1938, Fort Nelson was turned into a magazine for anti-aircraft gun ammunition. Fort Wallington was reserved for use as an emergency combined headquarters for the three armed services.

During the Second World War, the forts were used by various infantry units and although a number of anti-aircraft batteries were sited nearby, no heavy guns were mounted within the forts. Fort Nelson's magazine was heavily used during the war and Fort Wallington became the temporary home of the naval Commander-in-Chief, Portsmouth, when he was bombed out of Admiralty House, at the height of the blitz. An underground combined headquarters at Fort Southwick was constructed and this later replaced the one at Fort Wallington, the former being used with Southwick House to control the invasion of Europe in 1944.

In the post-war period, Fort Wallington remained unused for many years until it was sold in 1961 to a developer, who promptly demolished most of it, despite it being a listed building. Only the redan and part of the gorge wall remains. Fort Nelson was used as a naval store until it too became derelict, until being purchased

by Hampshire County Council in 1980, who have embarked on a programme of extensive restoration. The fort was opened to the public in 1983. Fort Southwick came into the care of HMS Dryad, the shore establishment at Southwick House, who used it for radar ranging purposes. Part of the land was taken over by the Admiralty Signal and Radar Establishment (now the Admiralty Research Establishment) and the fort was used by the Ministry of Defence as the headquarters of the Commander-in-Chief, Naval Home Command (CINCNAVHOME). Fort Widley was used by a bomb disposal unit and remained in army hands until 1968, when it was sold to Portsmouth City Council, who have partially restored it and opened it to the public as a museum. Fort Purbrook became an annexe of HMS Dryad and used for radar training until 1968, when it was closed. In 1969, Portsmouth City Council acquired the fort and leased it to the Portsmouth Youth Activities Centre. The two outworks of Fort Purbrook, Crookhorn and Farlington, were not equipped with permanent buildings and both have now been demolished, the former in the 1870's, the latter in the 1970's when British Gas took over the site.

The Purpose of the forts and their design

The British regular army in the nineteenth century was small and such forces which did exist were stationed in many parts of the empire. Britain's power lay in her navy and the government were unwilling to equip the home army to the extent that it could repel a possible invasion. If the navy was in foreign waters, or temporarily lost control of the English channel, it would be possible for an invader to land on the south coast of England and either march on London or to capture a port as a base for further operations. Portsmouth would be an ideal target, for not only would it be a useful supply base but its capture would deny the Royal Navy access to its principal base in the English Channel.

The ring of forts and defences around Portsmouth were designed to be manned by volunteers, who would prevent an enemy from taking control of the town or destroying it by bombardment and instead, force them to mount a set-piece battle. During the opening stages of an invasion, it was assumed that sufficient time would be allowed for the garrison to be alerted and be ready to man the fortifications, if the attacker turned on Portsmouth. The enemy having arrived at the outskirts of Portsmouth, might try and seize the defences by coup-de-main and if that failed, they would then adopt the traditional siege tactics until they were in a position

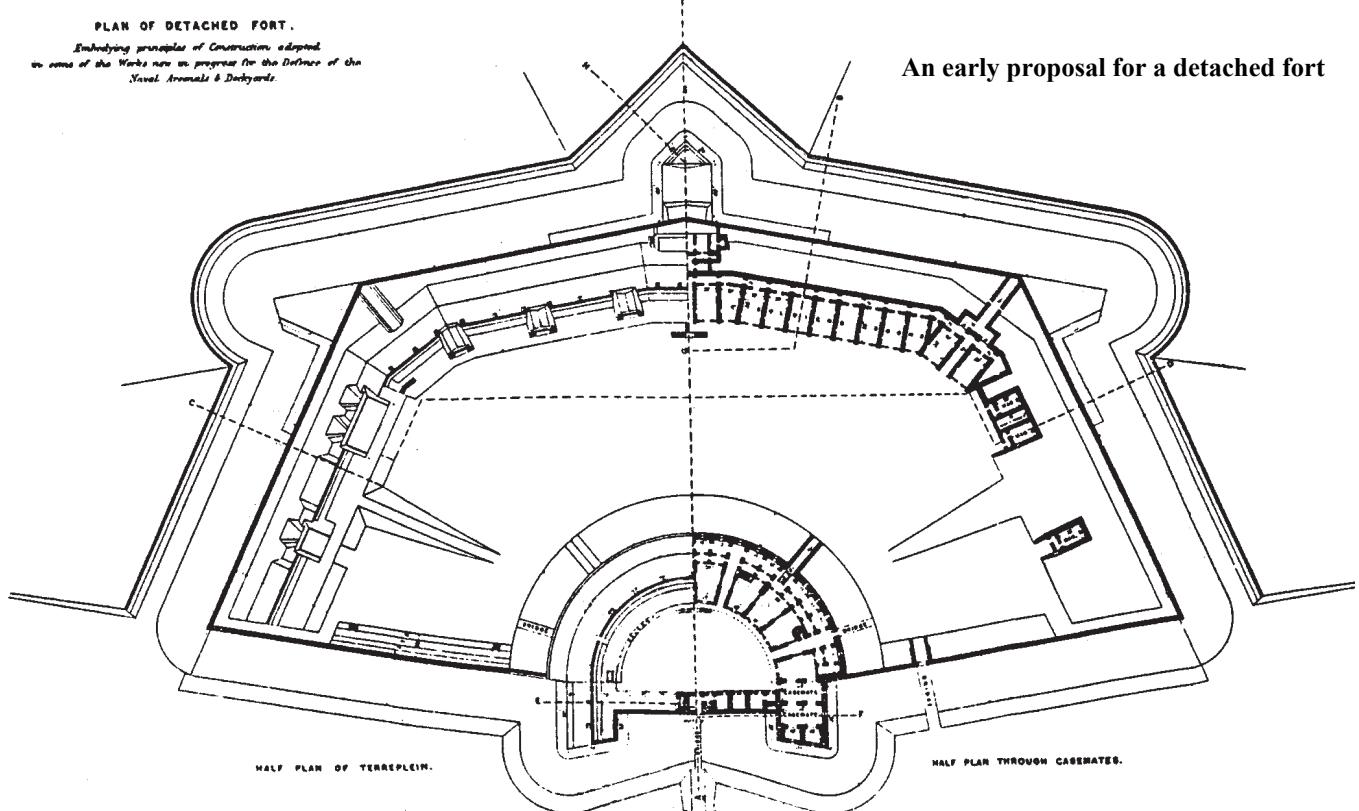
to cross the ditch and attack the fort directly. This could not be achieved without the build-up of considerable quantities of men, arms, ammunition and stores, all of which had to be transported across the channel and brought ashore in small boats. It was hoped therefore, that the forts would act as a deterrent and that the attempt would not be made. Similar defences were erected around Plymouth, Dover, Portland, Sheerness, Pembroke and later, Chatham, for the same purpose and it could be argued that they were successful. The value of the fortifications was not always appreciated and certain politicians and many soldiers were opposed to their construction. One particularly ardent opponent of fixed defences was Richard Cobden, Member of Parliament and Liberal reformer, who lived outside Midhurst, and wrote in February 1863:

"I went last week to see the fortifications and spent a couple of days in the neighbourhood. Starting by train from Chichester, I stopped at Havant, where a couple of officers from Portsmouth met me, and we went thence in a fly over the Downs by Portsdown Hill to Fareham, and then from the latter place to Gosport. Our road along the Downs passed beside the great inland chain of forts covering all the high ground within four or five miles of Portsmouth. .. They as well as an inner system of forts between the Downs and the sea, are planned on the theory that an enemy has beat us at sea, and landed in force, and having worsted an army on shore, these forts are to prevent the foreign force from taking up a position on the Downs, and shelling the docks at four or five miles off. Of course, the theory implies that the enemy is free to go elsewhere, and the reasonable inference may be that he would prefer going to London, or at least coming to rob the hen-roosts of those who live under the Downs!. The programme of course contemplates that our own soldiers are safely ensconced in these forts beneath their casemates, and behind gigantic ditches in the chalk - in fact you never saw such precipitous excavations as these are in the Downs to prevent a foreign army from getting at an English army, whilst the country is at its mercy. I need hardly say that there is not an officer of either service with a head on his shoulders who is under fifty, that does not look with supreme contempt, disgust and humiliation at these works."

The five Portsdown forts and the Hilsea Lines were all designed by Lt. William Crossman RE, who was on the staff of the Inspector General of Fortifications and worked under the direction of the Assistant Inspector General of Fortifications, Col. William Frederick Drummond Jervois. Broadly, the designs followed the 'polygonal' system, which was currently in favour and had been introduced by the Frenchman, Montalembert at the end of the 18th Century and developed by Carnot before being adopted by the Prussians. This system

surround the main work and separated the keep from the main work. Musketry caponiers flanked the keep and it was hoped that this feature could hold out until reinforcements arrived, if the fort was overrun.

With the Portsdown forts, wet ditches were impossible but much of the fort could be sunk into the soft chalk. The keeps-of-last-resort were to be retained in the original proposals but this was revised in 1863, when they became redans or casemated barrack blocks, with



abandoned the traditional bastioned fortification and replaced it with an enceinte of straight ditches flanked by caponiers. The armament was split into two parts, the main guns on the terreplein were to keep enemy batteries out of range of the fort and to break up attacks, whilst the secondary armament was partially concealed for protection and would only come into action if the enemy broke into the ditch. The polygonal system was also designed to blend the fort in with its surroundings to make it less of a target and this may be judged successful, since all the forts are invisible from the north - the intended direction of attack.

The slightly earlier works at Gosport, the 'Brockhurst' group were built with self-contained keeps-of-last-resort and had their barracks under the terreplein. Wet ditches

provision for rearward defence. Large two-storey caponiers were built to cover the other angles of the ditch. At Purbrook, Widley and Southwick, the barracks provided some of the features of the keeps-of-last-resort but at Nelson and Wallington, these were not provided.

Construction

The War Office purchased the whole of Portsdown hill from about 20 freeholders, the largest compensation being paid to the Thistlethwayte estate, owners of Southwick house and most of the village of Boarhunt. The hill was open downland with few buildings and a crossed by a number of trackways and drover's roads, the only one of any significance being the London Road, from Cosham to the village of Widley and 'The George' public house. Part of the land acquired to the east was

part of Purbrook park and this was needed either for the construction of the forts or as ‘Clearance rights’, which meant that no buildings could be erected that might mask the fire from the guns, or to give shelter to an enemy during an attack. This ‘free-fire zone’ extended right to the bottom of Portsdown hill on the northern side.

The surveyors marked out the site of each fort and any buildings, such as the Widley Mill, were demolished. The contractors moved onto site and William Tredwell, who was to build Widley, Southwick and Nelson forts, constructed a railway spur off the main London and South Western line at Fareham. The other contractors decided to save on transport costs and use the clay subsoil, by making the bricks locally, in temporary brickworks, the water being drawn from nearby rivers, or from the sea, until the supervising engineers put a stop to the practice!

Cuttings were made in the hill to form the ditches and where possible the chalk was carefully cut into blocks, covered in sacking and stored for the building of the ramparts, which was to form part of a later contract. Any loose material was used to fill up hollows in the hillside or dumped over the edge, particularly at Fort Southwick, where the remains can still be seen. There were few problems due to subsidence, except at the extreme western end, where Fort Wallington was built on a hillock of blue slipper clay and this required massive reinforcing with concrete before the problem was cured. The contractor carrying out work on the eastern end at Crookhorn Redoubt also encountered a similar outcrop of clay but here it was decided to reduce the size of the work and so keep to the chalk.

There were a few instances of the failure of brick arches, mostly where the wooden centering had been removed too soon and attempts to sink a well at Fort Southwick proved futile and the shaft was abandoned at about 400 feet. From then on, water would be drawn from the water works at Farlington and stored in each fort. Except at Wallington, where the water came from the adjacent works.

The construction work came under the direction of the Commanding Royal Engineer, Portsmouth (usually a Colonel), with day-to-day supervision by the District Officer, Royal Engineers, who, with a small staff of officers, civilian draughtsmen, surveyors and clerks, would be responsible for managing the works and the

contractors. The work was put out to competitive tender and awarded to the contractor with the lowest price, subject to him being competent. Once a month the surveyors would measure the work completed according to an established rate for each trade and if this tallied with the claim that the contractor had made, then the money would be paid. There was frequent disagreement however, and relations between the RE’s and the contractors was not always very cordial. Contractors were often short of money and extra claims were often put in, particularly if bad weather held up the work.

Sets of drawings were prepared by the office of the Inspector General of Fortifications for the general plan of each fort but much of the detailed work was designed by the local District Officer, as the work progressed. In the case of Fort Nelson, a set of original drawings has survived with the contractor’s signature appended.

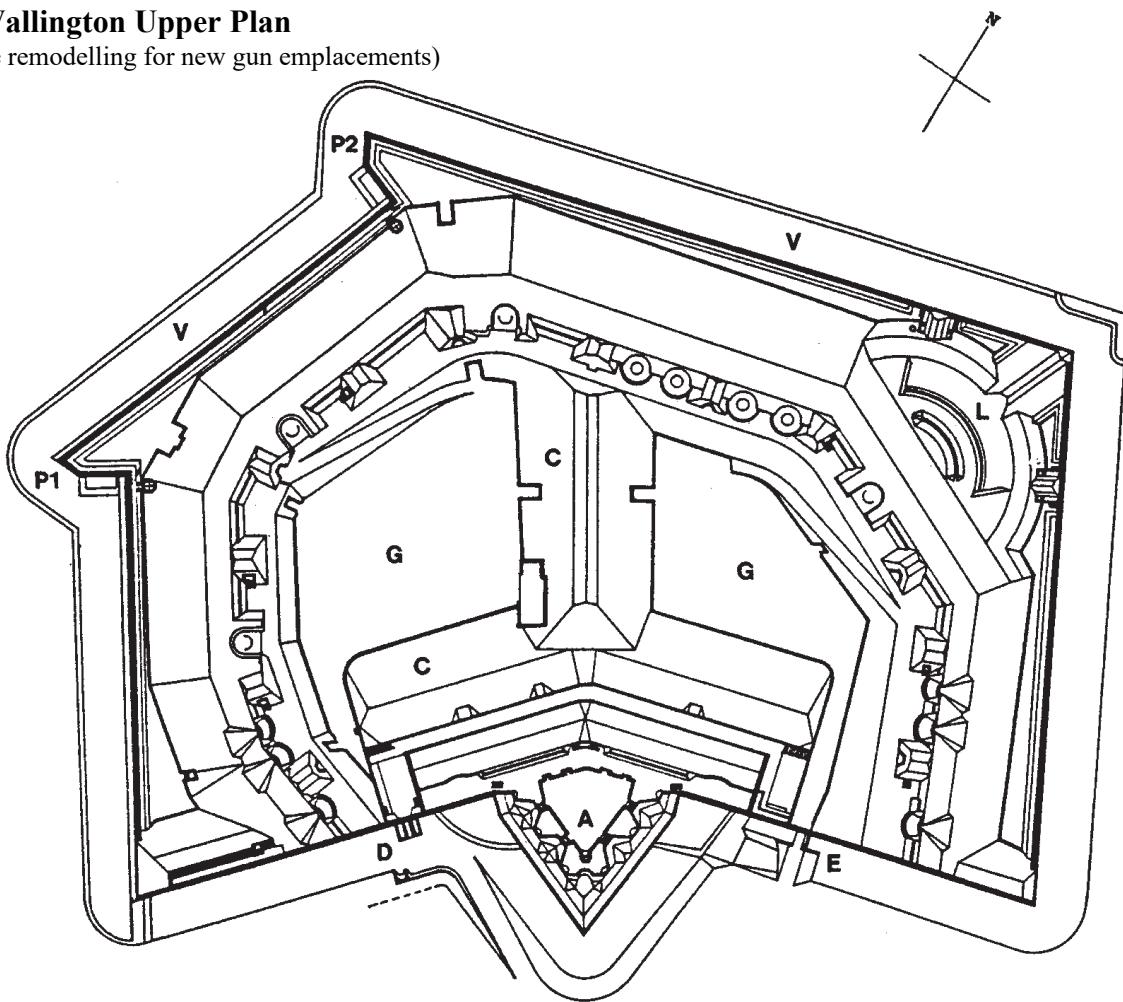
The Commanding Royal Engineer was also responsible for the administration of the finances and he was required to keep a proper record of all monies expended on the purchase of land and contracts. This was not always easy, since money was voted each year and if there was any spare funds left at the end of a financial year, then ways and means had to be found of keeping that until the next year, or it would be lost to the Treasury. In 1868, when the Committee of Enquiry was examining the amount of money spent, it had to be admitted that not all the money could be accounted for and the Committee demanded that in future, proper accounts should be kept.

Description of the forts

Each fort was designed to be self-sufficient and consequently they were not connected by underground passages. A military road was constructed on the south side of the hill, linking the rear of each fort and this would have been out of sight of an advancing enemy, particularly as it was planned to augment the forts with a ditch and earthwork along the crest of the hill. The forts are constructed in red stock brick of local manufacture and laid in English bond. Portland stone lintels and granite cills are provided at the embrasures with york stone pavings, where required. The forts are completely functional, only the entrance gates had any form of decoration applied.

Fort Wallington Upper Plan

(as at the remodelling for new gun emplacements)

**Fort Wallington OS Grid Reference SU589069**

Contractor: Messrs Lee & Sons, Crown Wharf, Nine Elms, London SW Costs: £100.569.17.9 3/4. against an estimate of £75,000 in 1861.

Commenced: July 1861.

Completed: 5th August 1874

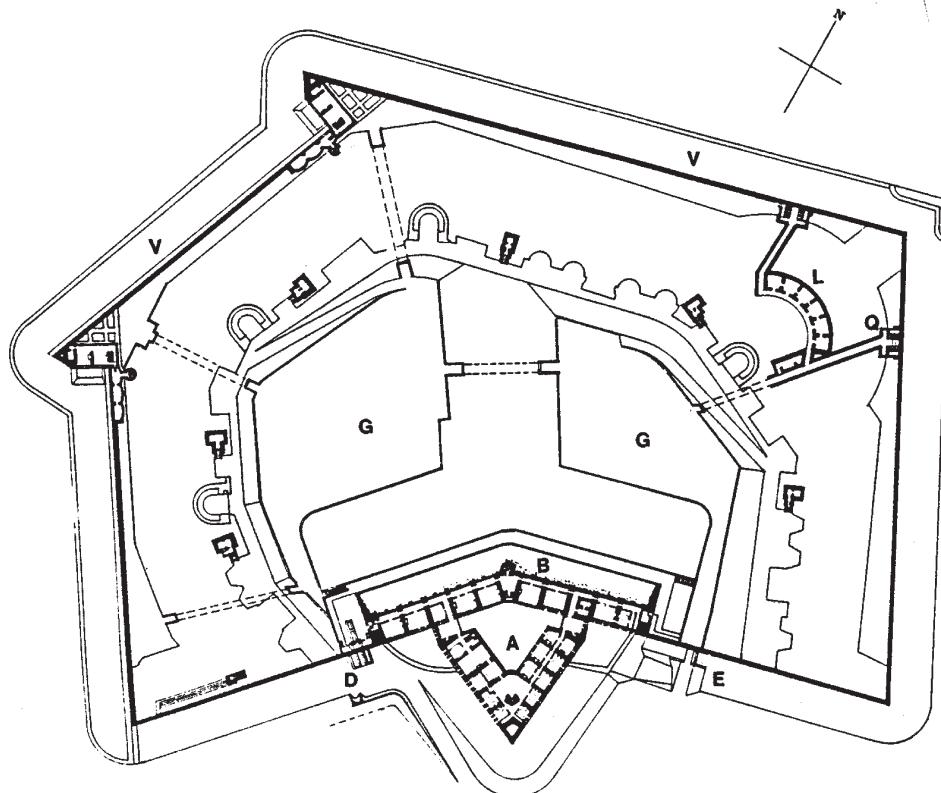
Armament: 17 guns

Complement: 1 Field Officer, 7 Junior Officers, 172 other ranks, 16 hospital patients and 2 horses. Present use: 80% demolished - A private industrial estate.

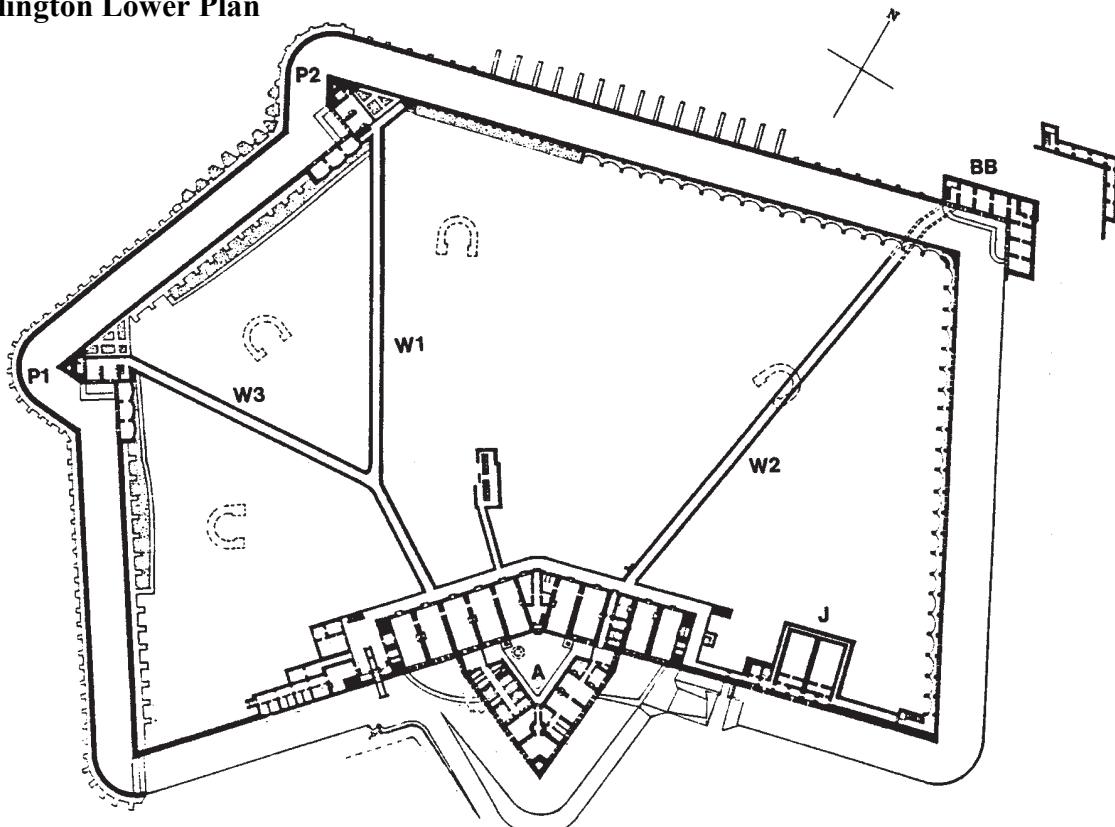
Closed but may be viewed from outside.

This was the most westerly fort in the line and was constructed on a small hill overlooking the village of Wallington and on a bend in the river of the same name. This six-sided work was the smallest of the five forts, with ditches being protected by two, double storey caponiers on the north west and west angles, and a two storey counterscarp gallery covering the north east and east ditches. Tunnels connect these features to a barrack

block and to the main magazine, which was behind the gorge wall in the south east angle. On the terreplein, emplacements were constructed for the main armament, which in common with the other forts was modified to include concrete 'Moncrieff' disappearing gun positions. A Mortar battery of six casemates was let into the north east angle and this together with an abandoned covered way on the glacis, indicates what was considered to be the likely direction of attack. Trial borings had shown that the subsoil consisted of 30 to 40 feet of clay and gravel over a chalk bed and because of this, it was decided to abandon the underground magazine and to re-site it in the south east corner of the fort, under the rampart. The scarp walls were specially strengthened with counterfort buttressing and double-tier scarp galleries built 'en-decharge' with dry packing, to prevent subsidence. Despite this, the west and north west scarp walls both failed after heavy rains and were massively rebuilt in concrete. The scarp galleries were abandoned, since they could not be accommodated.

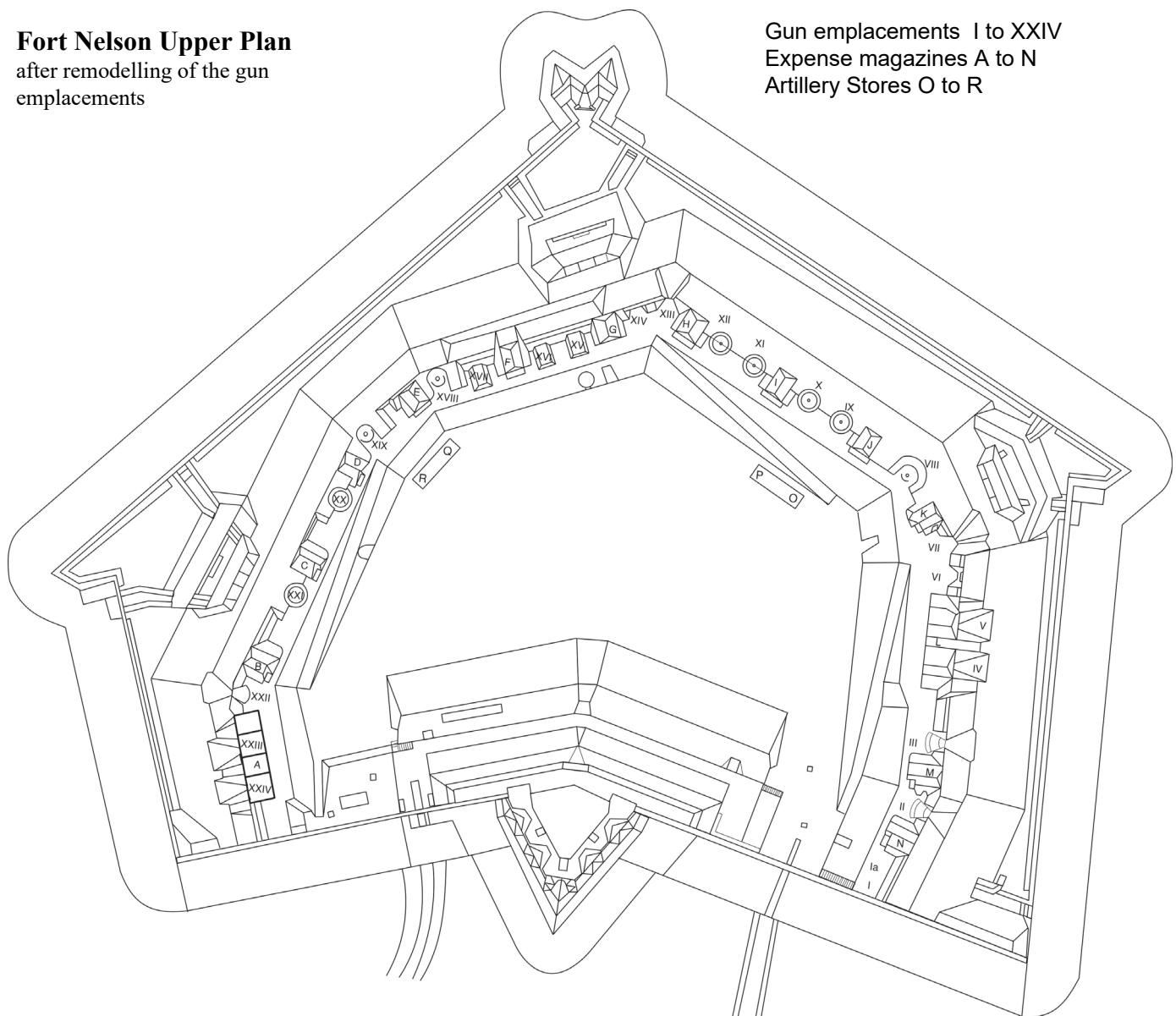
Fort Wallington Middle Plan

- A Redan
- B Barracks
- C Traverse
- D West entrance
- E East entrance
- F Water tank
- G Parade
- H Chemin-de-ronde
- J Main magazine
- K Haxo casemate
- L Mortar battery
- M East demi-caponier
- N Central caponier
- P(1) West demi-caponier
- P(2) North west demi-caponier
- Q Flanking gallery
- R Steps to terreplein
- S Stairway (numbered)
- T Artillery store
- U Expense magazine
- V Ditch
- W Gallery or passage
- X Entrance to mortar battery
- Y Shifting room
- Z Examination room
- AA Ditch flanking gallery
- BB Counterscarp gallery
- CC Inner ditch
- DD Flanking battery
- EE Musketry caponier
- FF Courtyard
- GG Covered way
- HH Scarp gallery

Fort Wallington Lower Plan

Fort Nelson Upper Plan
after remodelling of the gun
emplacements

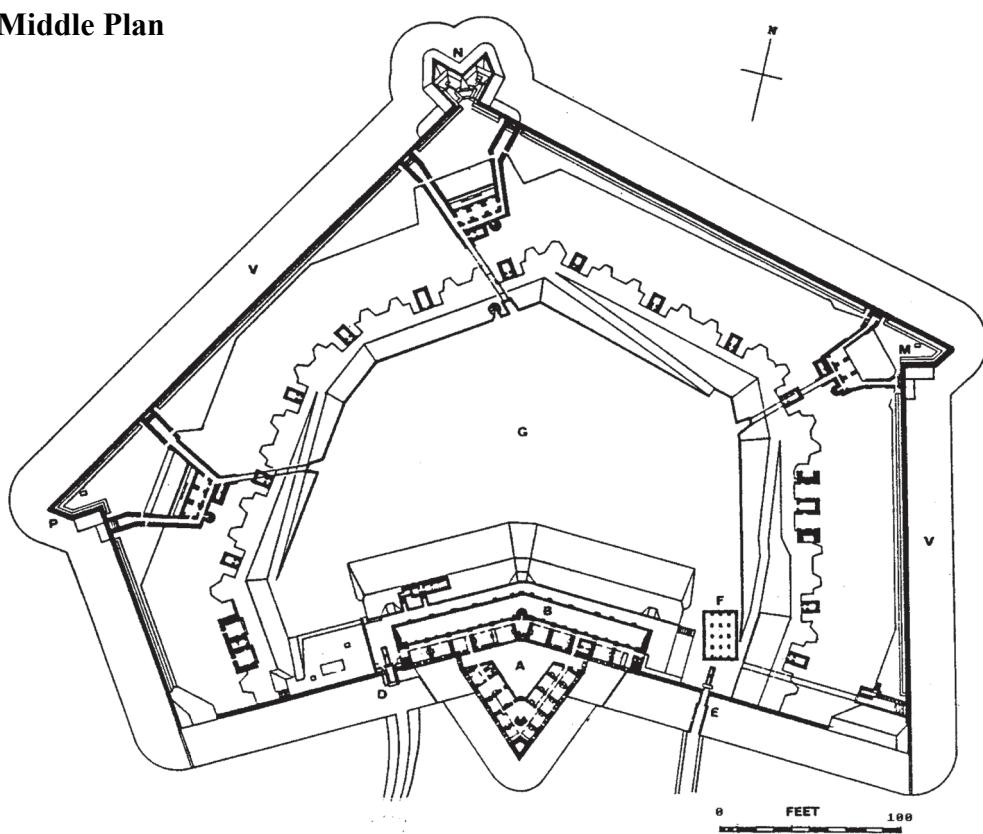
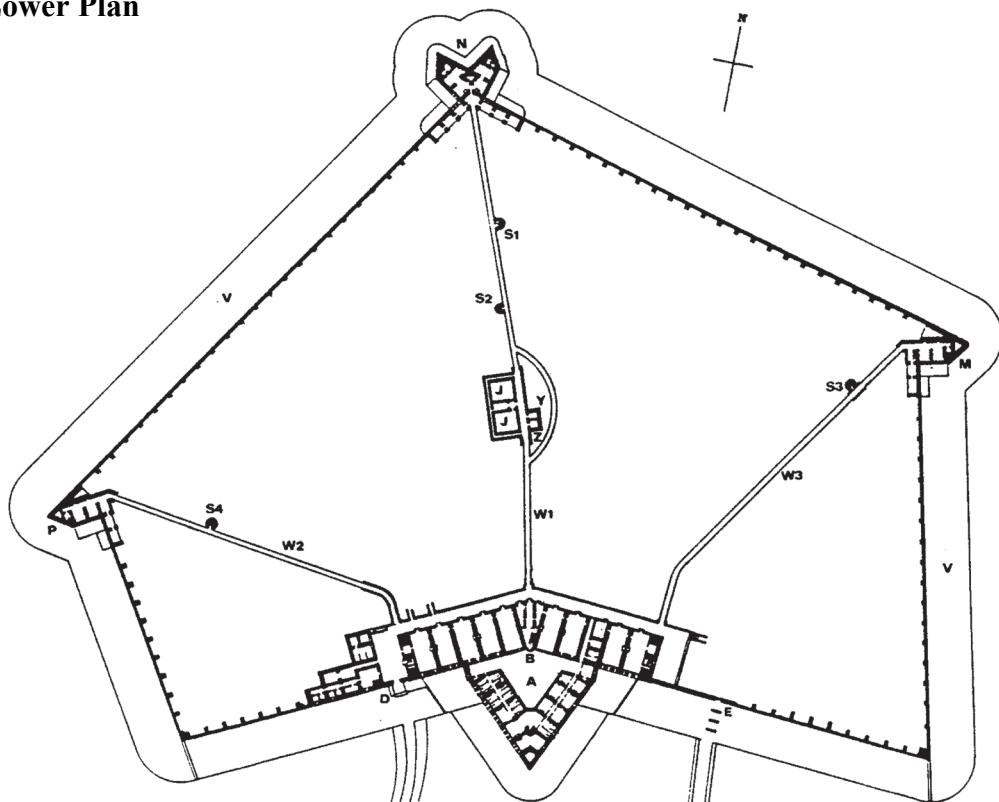
Gun emplacements I to XXIV
Expense magazines A to N
Artillery Stores O to R



Fort Nelson

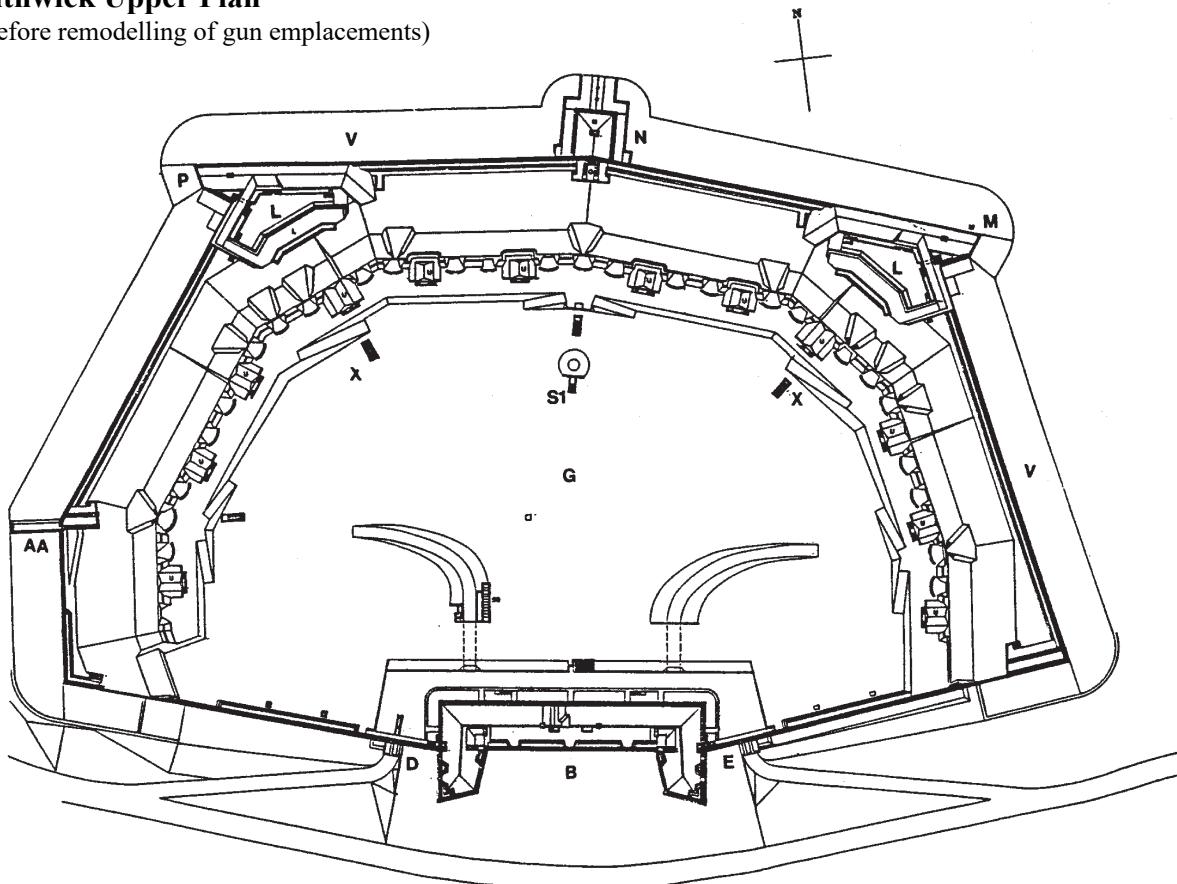
OS Grid Reference SU 6067072
Contractor: William Tredwell, Parliament St,
Westminster London SW
Costs: £78,649 (Estimate of 1868)
Commenced: March 1861.
Completed: c1870.
Armament: 26 guns
Complement: 1 Field Officer, 7 Junior Officers, 172 other ranks, 16 hospital patients and 2 horses.
Present use: The fort is maintained by Hampshire County Council and leased by The Royal Armouries to display their collection of artillery. Open all year.

Fort Nelson is situated 250 feet above sea level and is 2000 yards east of Fort Wallington (centre to centre). The trace is six-sided, with ditches protected by two storey demi-caponiers on the east and west angles, with a two storey double caponier at the north salient. Above each of the caponiers is a mortar battery for three guns in each. The counterscarp walls remain as originally planned, without revetment. The interior of the fort was much altered in 1938, when the parade was concreted and rows of magazines for anti-aircraft ammunition were constructed, although most of these buildings have now been demolished. The western gorge wall was cut through and a new high level gateway was inserted, to permit lorries to enter and leave the fort.

Fort Nelson Middle Plan**Fort Nelson Lower Plan**

Fort Southwick Upper Plan

(as built, before remodelling of gun emplacements)

**Fort Southwick (Pronounce it Suthick)**

OS Grid Reference SU 628069

Contractor: William Tredwell, Parliament St,
Westminster, London SW

Costs: £94,262 (Estimate of 1868)

Commenced: c1861.

Completed: c1870.

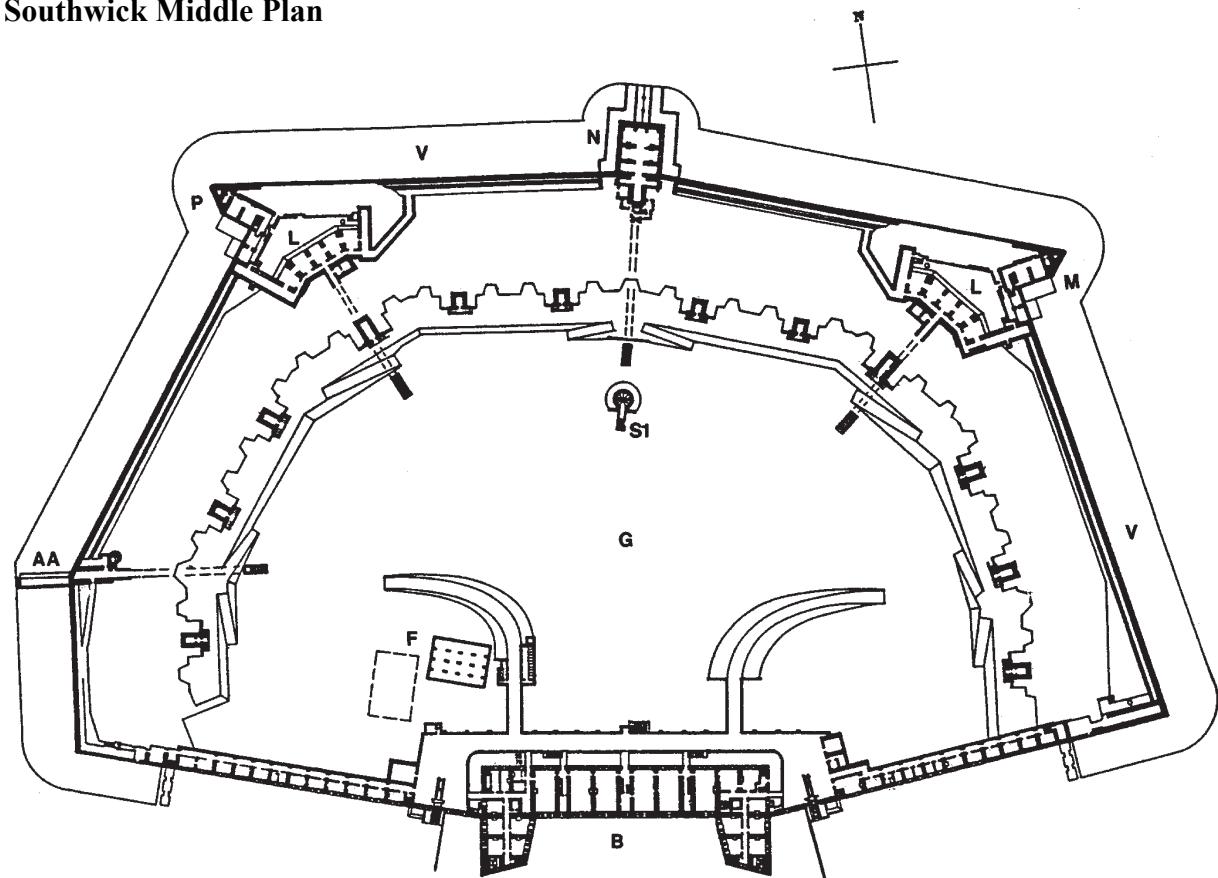
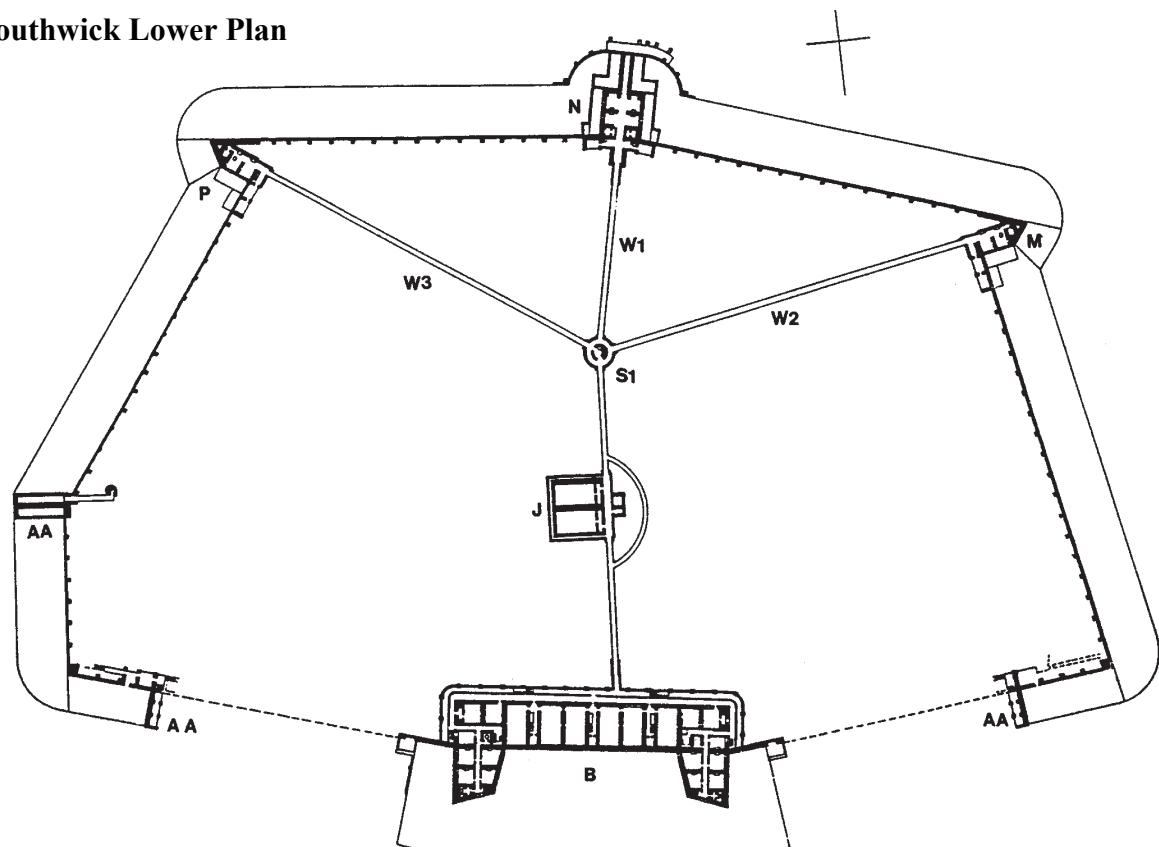
Armament: 23 guns

Complement: 5 Junior officers, 226 other ranks, 20
hospital patients and 2 horses.

Present use: Recently released by MoD and bought partly for conversion to apartments and partly to store a private collection of military equipment. Previously the headquarters of Commander-in-Chief Naval Home Command (CINCNAVHOME). Closed to the public but parts (barrack block and gorge) can be seen from the outside.

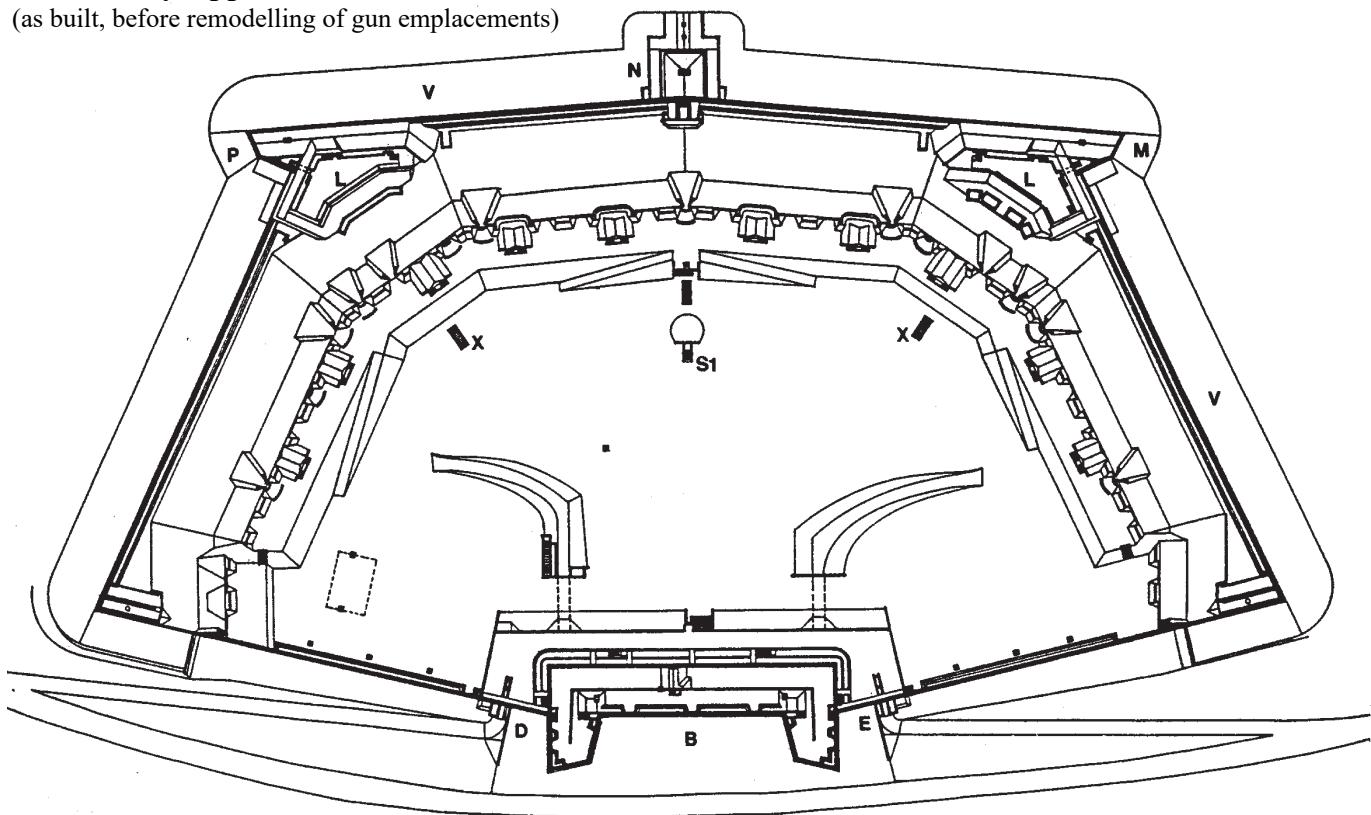
This fort is situated 400 feet above sea level and is 2400 yards east of Fort Nelson. The trace is seven-sided, with two demi-caponiers on the north west and north east angles, with a double caponier at the north salient. A small musketry caponier covers the short south west ditch, which is obscured from the north west caponier, with a flanking gallery at the level of the chemin-de-ronde, to cover the dead ground at that point also. These features are linked by a spiral stairway and connect with the parade via short tunnel under the terreplein and not directly to the barrack block, as at Purbrook. As it was at the highest point Southwick acted as the main fresh water reserve for the line, receiving its supply from Farlington and storing it in two tanks with a combined capacity of 184,000 gallons.

Fort Southwick closely resembles Fort Widley in many of its features and apart from the inclusion of an extra angle, shares a common plan with that fort.

Fort Southwick Middle Plan**Fort Southwick Lower Plan**

Fort Widley Upper Plan

(as built, before remodelling of gun emplacements)

**Fort Widley**

OS Grid Reference SU656075

Contractor: William Tredwell, Parliament St, London SW

Costs: £93,980 (Estimate of 1868)

Commenced: c1861

Completed:c1870

Complement: 5 officers, 226 other ranks, 20 hospital patients and 2 horses.

Armament: 21 guns

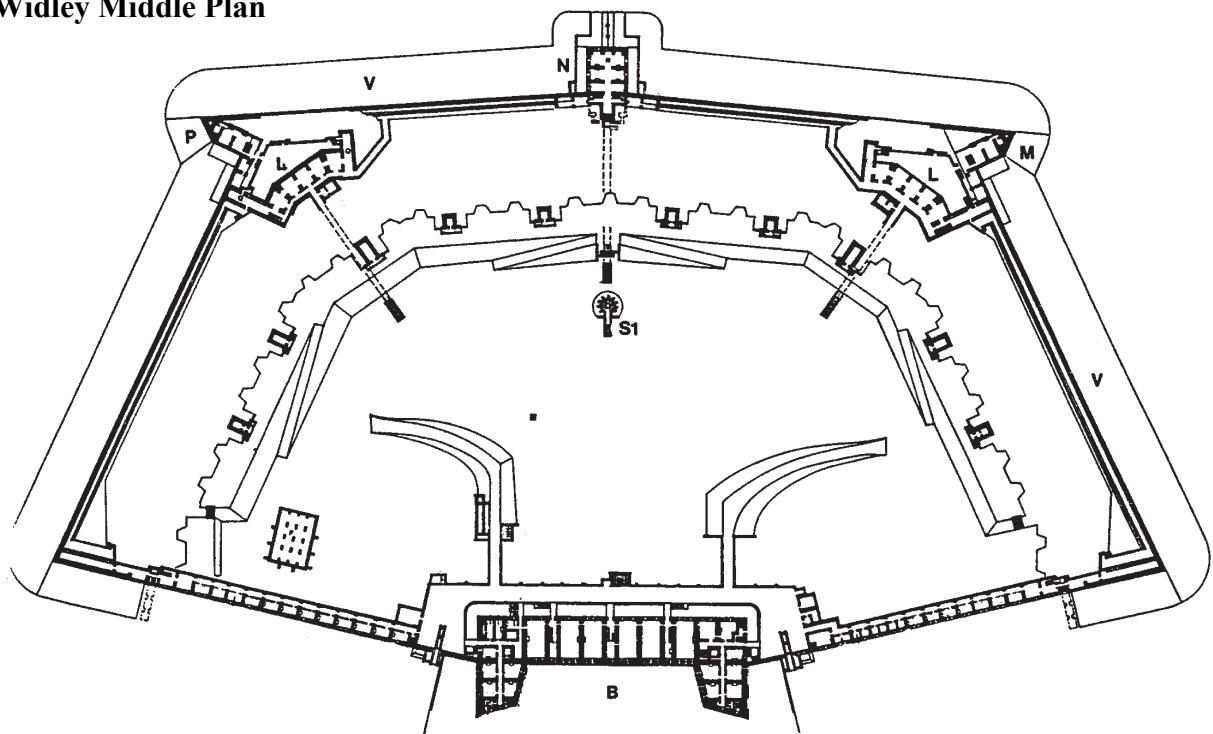
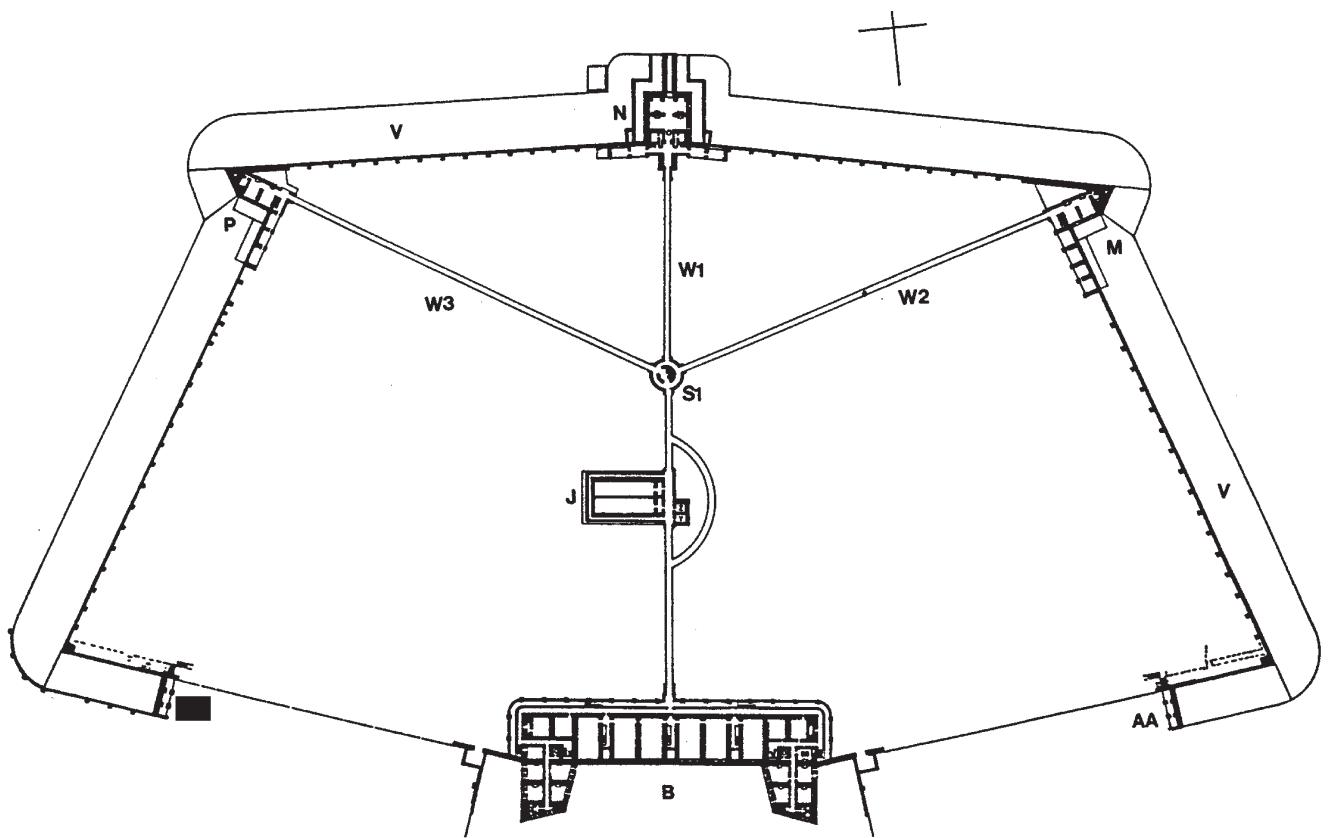
Present use: Preserved by Portsmouth City Council as a museum. Open to the public on selected occasions during the Summer.

Fort Widley is 350 feet above sea level and is 3100 yards east of Fort Southwick. The fort is six-sided and is symmetrical about a north-south axis. The east and west ditches are protected by two storey demi-caponiers, with a double caponier protecting the north east and north west ditches. Musketry galleries protect the ends of the ditches on the south side and these are accessed from stairways leading off the passage behind the gorge wall. The demi-caponier on the north east corner is equipped with a four-bay flanking casemate, instead of the usual three but there does not seem to be a logical reason for this.

Restoration work at the fort is not complete and parts of the fort have remained closed. The main magazine is displayed in its role as a civil defence command centre.

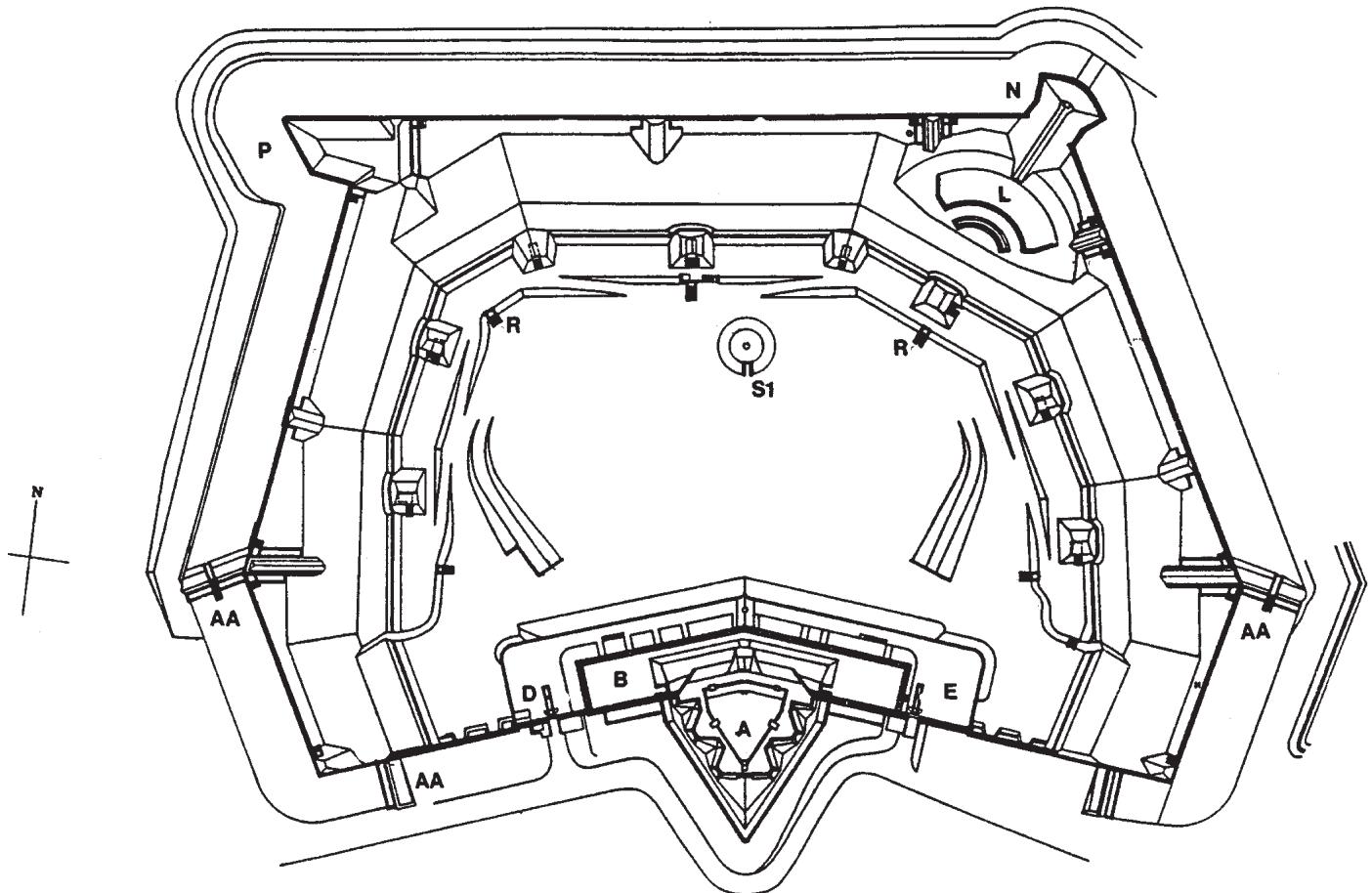


Fort Widley: West entrance

Fort Widley Middle Plan**Fort Widley Lower Plan**

Fort Purbrook Upper Plan

(as built, before remodelling of gun emplacements)

**Fort Purbrook**

OS Grid Reference SU 678065 Crookhorn Redoubt OS Grid Reference SU 682067 Farlington Redoubt OS Grid Reference SU 687065

Contractor: Edward Baker & Sons, Stangate St, London
SE Costs: £135,000 (Estimate of 1868)

Commenced c1862

Completed: c 1870

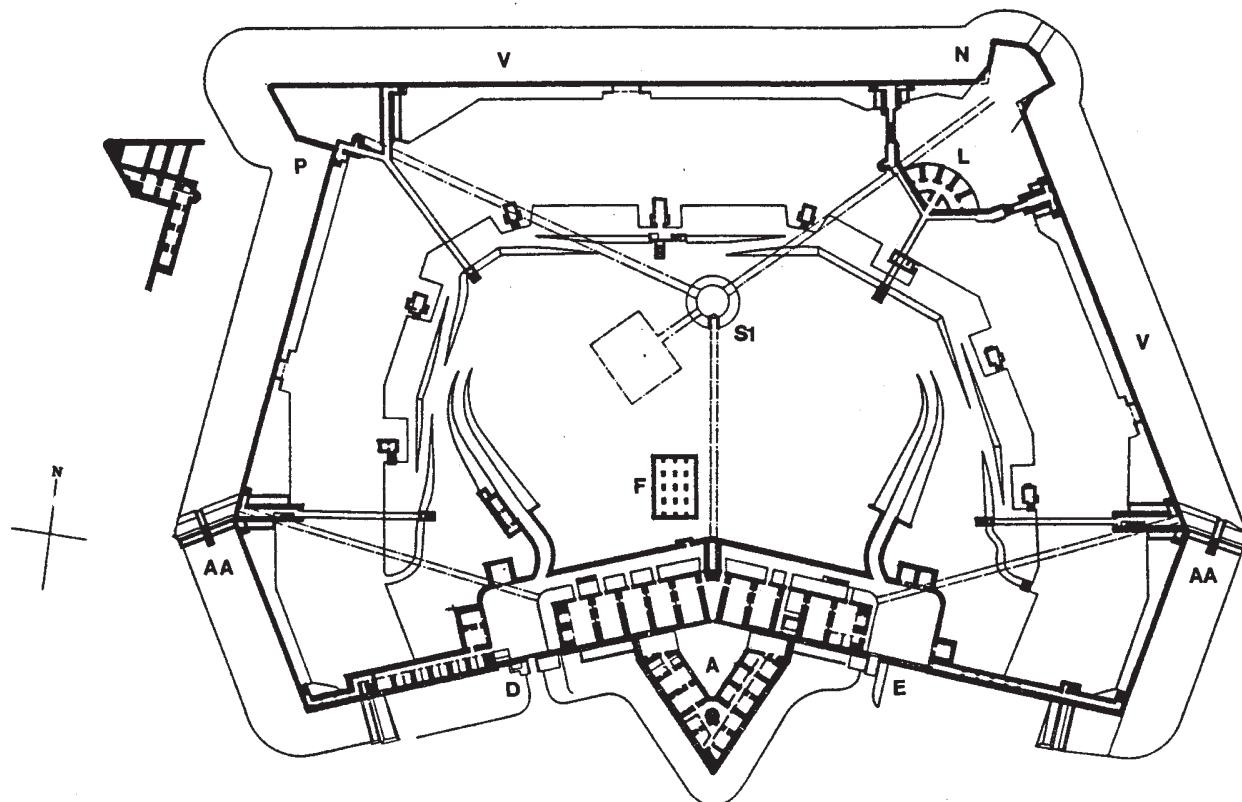
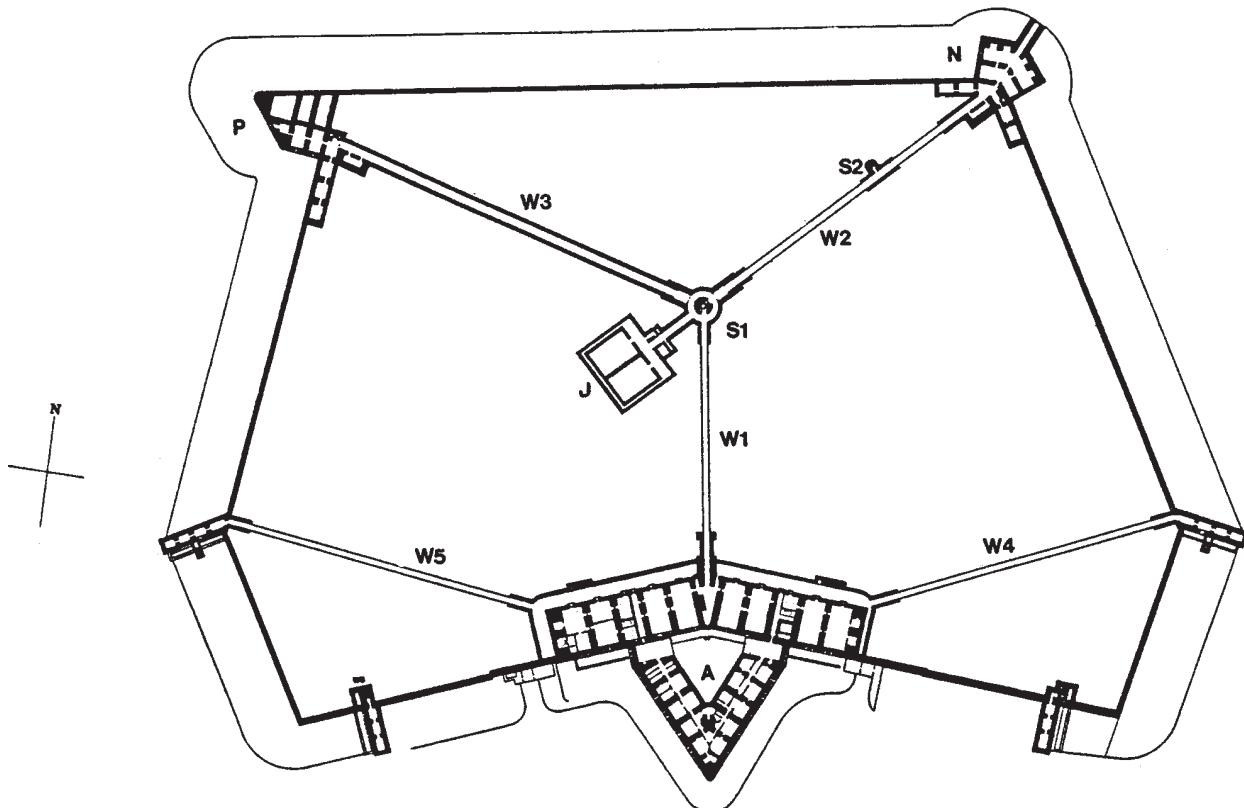
Complement for Purbrook: 5 Junior Officers, 227 other ranks, 20 hospital patients and 2 horses.

The outworks had no provision for barrack accommodation.

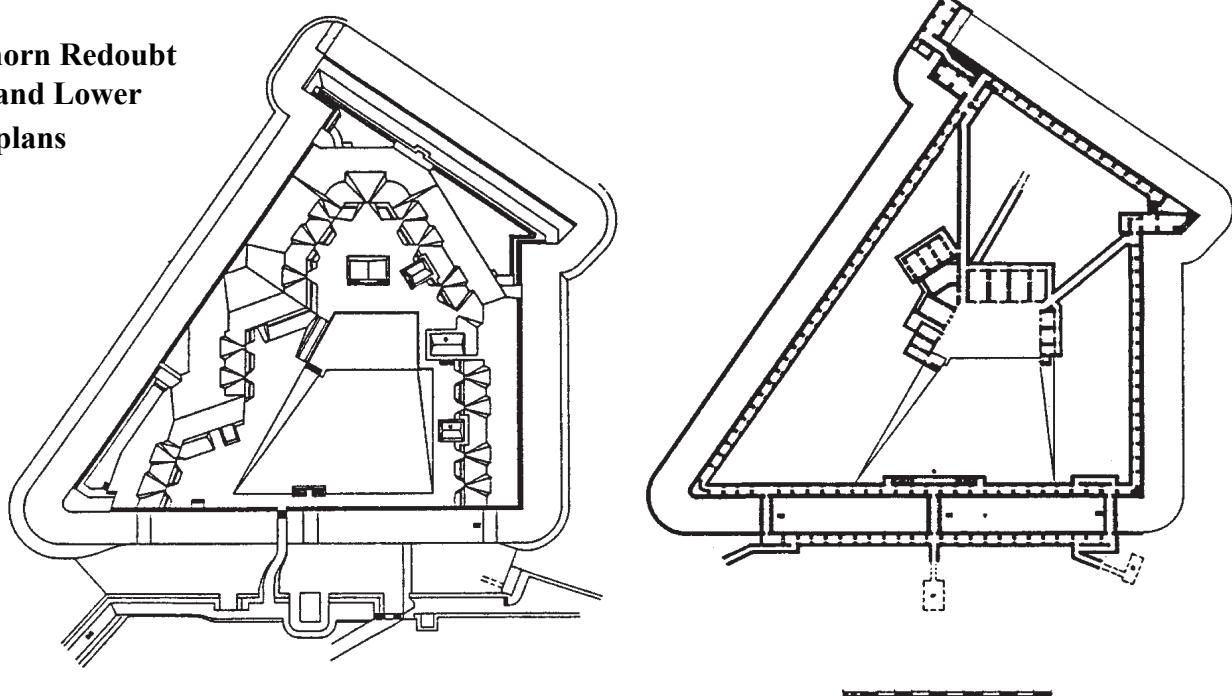
Present uses: Purbrook is owned by Portsmouth City Council and leased to the Portsmouth Youth Activities Committee from whom permission to view must be sought. Crookhorn and Farlington have both been totally demolished.

Fort Purbrook is the most easterly fort and is 300 feet above sea level, 2400 yards east of Fort Widley. The trace is seven-sided, with a single demi-caponier at the north west angle and a double caponier covering the north and north east ditches. The short south west and south east ditches are covered by single-sided musketry caponiers (there is a difference of level at this point, which protects the rear of the galleries). Additional musketry galleries protect the continuation of these ditches on the southern sides.

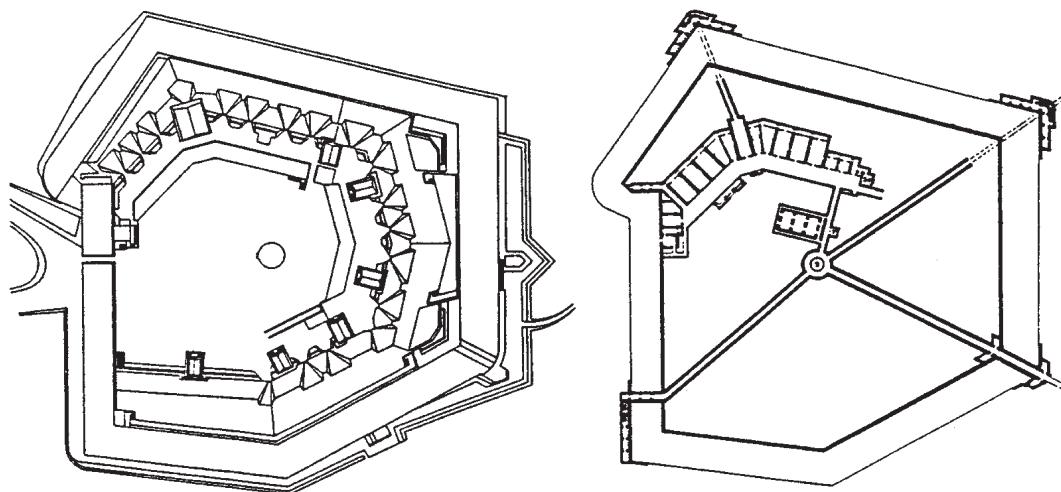
Fort Purbrook would have been vulnerable on its eastern side had it not been for the support of its two outworks, Crookhorn and Farlington, covering the north east and east sides. Both the outworks were built by the same contractor as Purbrook but the plans of both were considerably altered from those shown in the design drawings reproduced in this book.

Fort Purbrook Middle Plan**Fort Purbrook Lower Plan**

**Crookhorn Redoubt
Upper and Lower
design plans**



Farlington Redoubt Upper and Lower design plans

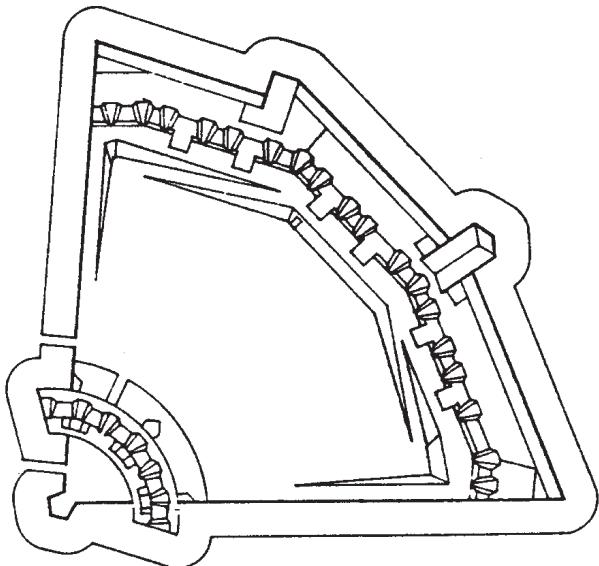


Crookhorn was to have had caponiers, counterscarp and scarp galleries and its own magazine and barracks. Unfortunately, the fort was sited half on the same stratum of blue slipper clay that had been found at Wallington and in order to reduce the costs, the northern half was abandoned, leaving the remainder as just a prepared earthwork. It can have had little value and is shown as demolished in the armament returns of 1876.

Farlington was also to have been fitted with barracks and a magazine, together with substantial underground works to protect the ditches and to permit counter-mining. Costs prevented the work being constructed as planned. It appears that the barrack

casemates were not constructed, instead the work was prepared as a D shaped rampart with traverses and shell recesses, a dry ditch but no counterscarps. The fort was to be manned in time of attack by gun crews from the nearby Fort Purbrook. A main magazine to hold mixed natures of projectiles was situated on the parade. By 1891 the work was complete with a mounted armament of five 64pr R.M.L. 71 cwt guns on parapet carriages and two 64pr R.M.L. 58cwt guns on Moncrieff disappearing carriages. At the south west salient was a 4inch B.L. gun.

The redoubt continued its existence until after the Second World War, when it became little more than a quarry, being finally demolished in the 1970's.



"Langston" Redoubt Ground plan

It was believed that Farlington Redoubt was linked to Fort Purbrook by a tunnel from Crookhorn but no evidence has been found for this at the Purbrook end, where logically it should appear at the end of the musketry gallery at the eastern angle, nor is such a tunnel shown on any plan. By contrast, Crookhorn was shown linked to Purbrook by a tunnel and there is evidence for this in the musketry gallery at the end of the double caponier at the north east salient, where the plan shows it to be.

Langston(e) Redoubt

OS Grid Reference SU688049 Cancelled c1867.
This fort was to have been sited on the Farlington Marshes, facing east and covering the eastern approaches to Portsmouth, it was to have been alongside the railway line and would have been in an ideal position to prevent an enemy advance, in fact the whole of the Portsdown line was in danger of being outflanked, without it. The fort was to have had a four-sided trace, with positions for 18 guns on the terreplein and a defensible barrack block at the south west angle. The whole to have been enclosed in what was almost certainly a wet ditch. The land and clearance rights were purchased but the work was abandoned because of the rising costs of the other works. The Committee of 1868 were told that a less elaborate earthwork would be built at the time of expected attack. The Havant - Bedhampton by-pass, the A27, now runs over the site.

The Gorge Defences and Barracks

The gorge defences of the Portsdown line evolved from the Gosport forts of 1857, where there was provision for a 'keep of last resort', which effectively isolated most important part of the fort and allowed it to stay in action, if the rest of the fort was overrun by the enemy. This idea persisted in the original planning of the Portsdown forts, although the keeps were to have had different traces with dry ditches. Wallington and Nelson were to have polygonal or semi-circular concave batteries facing south, with provision for internal ditches with counterscarp galleries.

Purbrook was to have had a barrack block similar to that eventually provided at Widley and Southwick, but with a separate block for officers, situated on the south side of the fort and outside the main defences linked by underground passages. At Southwick and Widley the keep was extended round on the north side by a huge double storey armoured battery of horseshoe plan. On either side, large two storey barrack blocks were built.

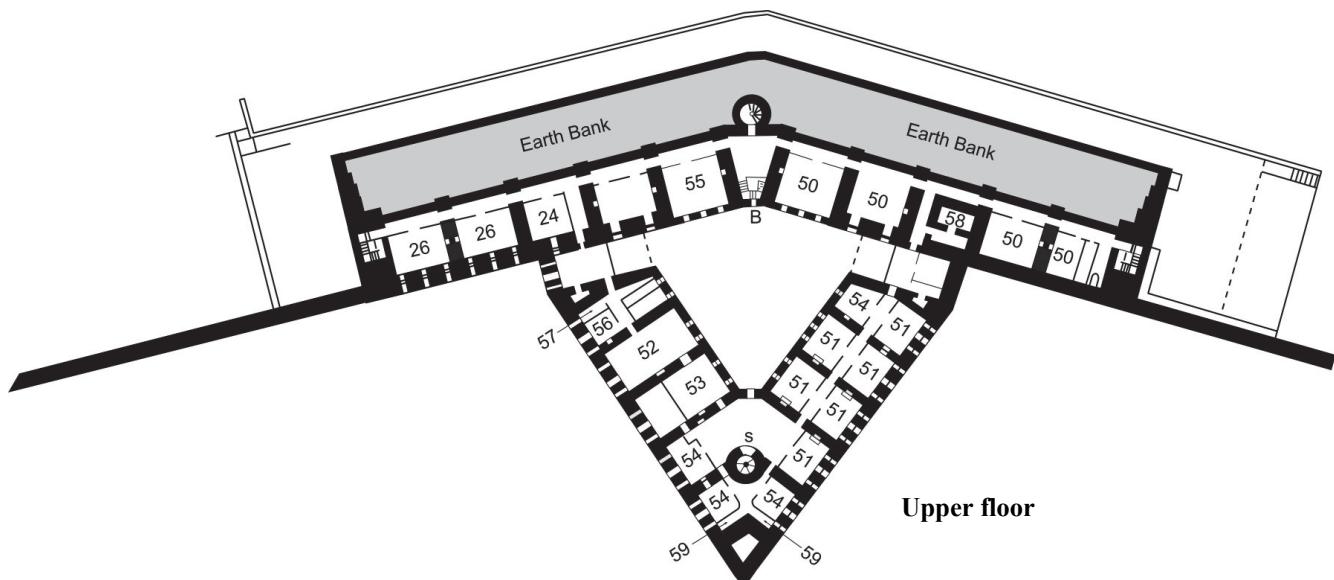
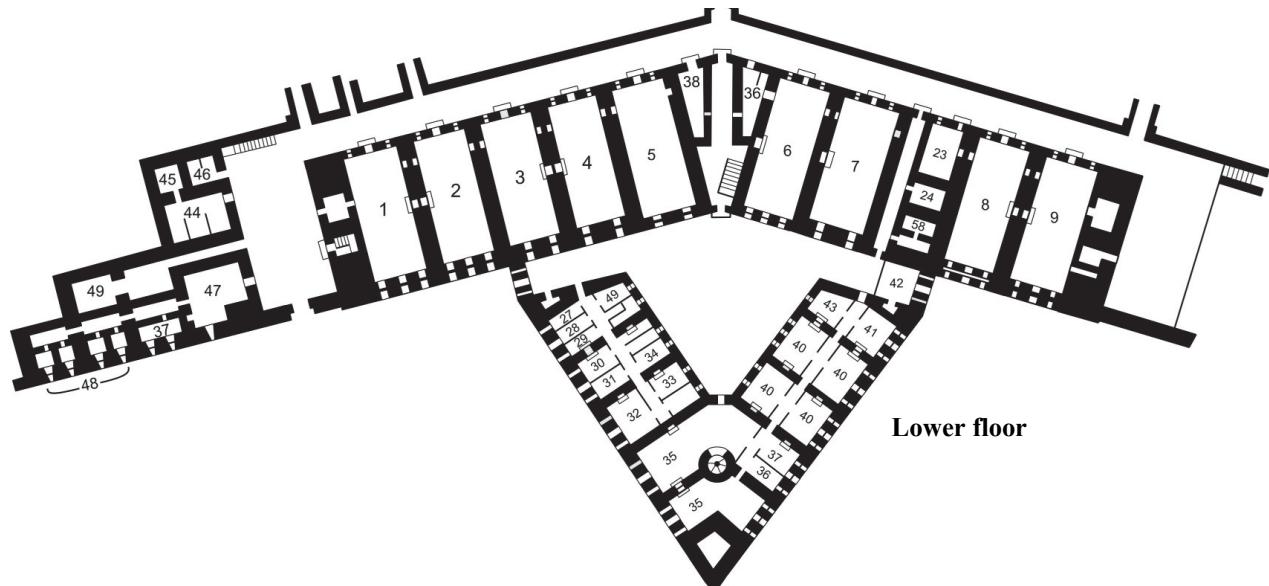
These arrangements were the subject of considerable argument, not least because of their high cost and smaller and simpler plans were subsequently adopted. The complement of the forts was agreed by the Defence and Fortifications Committees on 20th January 1862 and the final plans for the redans was approved on 20th April 1863, when the construction work on the forts was well advanced. The evidence of this delay is to be found in the joints between the old and new brickwork, where the two contracts met.

Nelson and Wallington

For these two forts the redan is triangular in plan with two short flanks and is of two storeys. The ground floor was fitted out as an infirmary and for messing, while the floor above was set aside for officers' accommodation. Stairs were provided at each end and the centre is an open courtyard to admit light and air. All windows facing the field were arranged as a single artillery embrasure flanked by two on either side for musketry. The former being fitted with demountable casement windows and recoil rings. In time of attack, light artillery pieces would be brought into the redan and the rooms cleared for action. The windows facing away from the field are ordinary three-light sash frames. The floors were of timber, the upper level being strengthened by wrought iron fabricated 'I' beams, to support the weight of artillery. Most of the flooring was destroyed at Nelson and has been replaced with concrete. The roof is

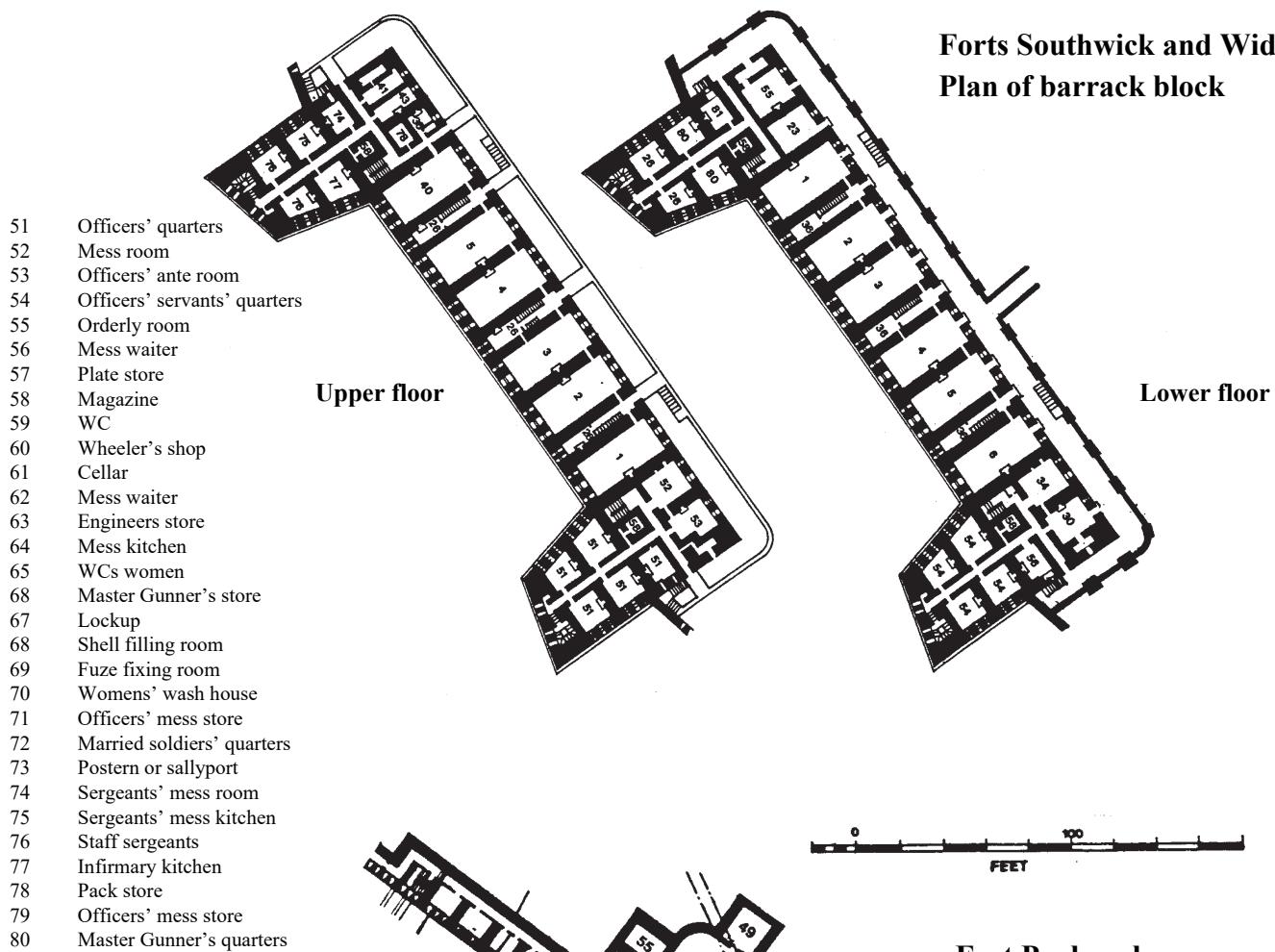
Forts Wallington and Nelson Plan of barrack block and redan

1-20	Soldiers' rooms	27	Beer cellar	35	Barrack Store	43	Hospital sergeant
21	Canteen	28	Wine cellar	36	Ablutions/Bathroom	44	Stable
22	NCO's quarters	29	Larder	37	WCs men's	45	Forage
23	Kitchen - cookhouse	30	Scullery	38	WCs sergeants'	46	Harness
24	Store	31	Pantry	39	CO's quarters	47	Guard room
25	Bread and meat store	32	Mess Mens' Store	40	Infirmary	48	Cells
26	Sergeants' quarters	33	Mess Room	41	Dispensary	49	Coal store
		34	Mess Kitchen	42	Pharmacy store	50	Field Officers' quarters



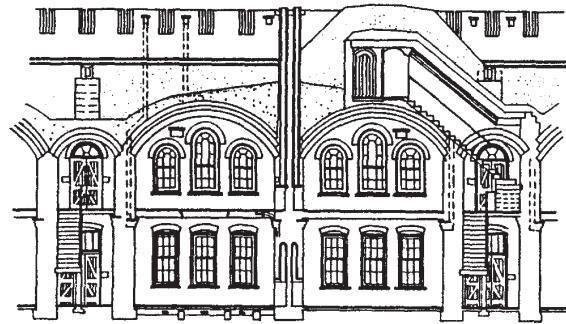
the usual brick bomb-proof vault, with earth covering, accessed by a circular stair at the salient. The plan of the barrack block is dictated by the angle of the gorge wall behind the redan and is also of two-storeys. The lower floor contains nine rooms for 20 soldiers each, a small cookhouse, bathroom, ablutions and an expense magazine. At first floor level, the northern half was bomb-proofed and covered by a massive earth bank.

The remainder was divided up into small partitioned rooms for field officer's and sergeants' quarters. A circular stair in the centre leads up to the roof level. Additional staircases were provided at each end. To the left of the western entrance gate, a number of bomb-proof rooms were provided for various ancillary functions of the barracks. These were the guardroom, cells, coal store and stables, forage and harness rooms for the two horses.

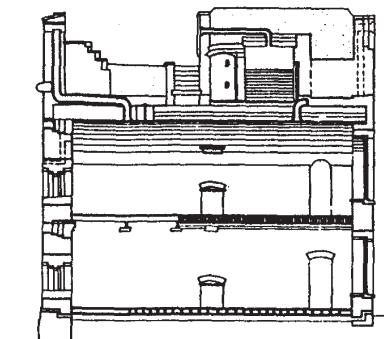


The diagram shows two floor plans of a military barracks complex. The left plan, labeled 'Upper floor', features a large rectangular building with various rooms numbered 1 through 62. A central courtyard is accessible from room 1. The right plan, labeled 'Lower floor', shows a similar layout with rooms numbered 47 through 67. A central redan (a three-sided fortification) is located in the lower part of the building. Both plans include labels for 'Upper floor' and 'Lower floor'.

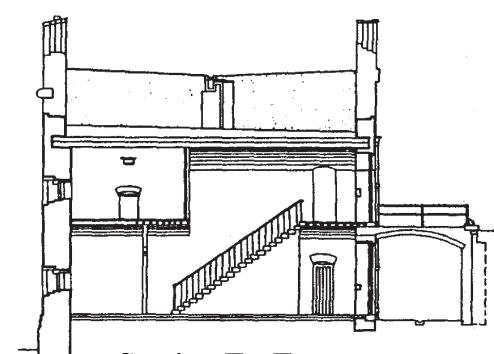
Forts Southwick and Widley - Detailed plans and section of the barrack block



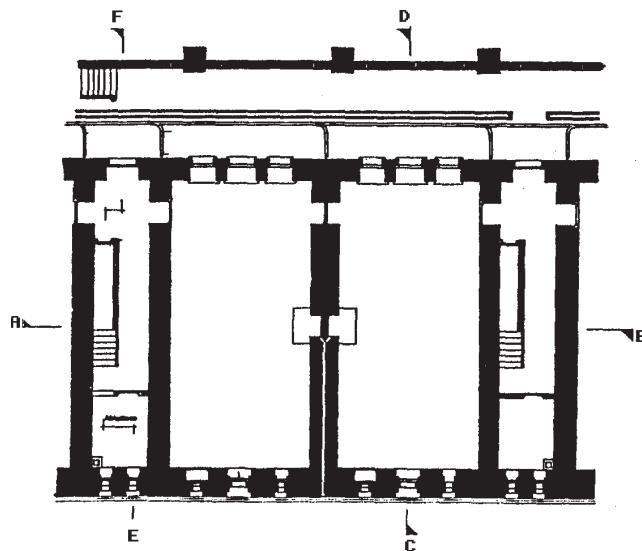
Section A - B



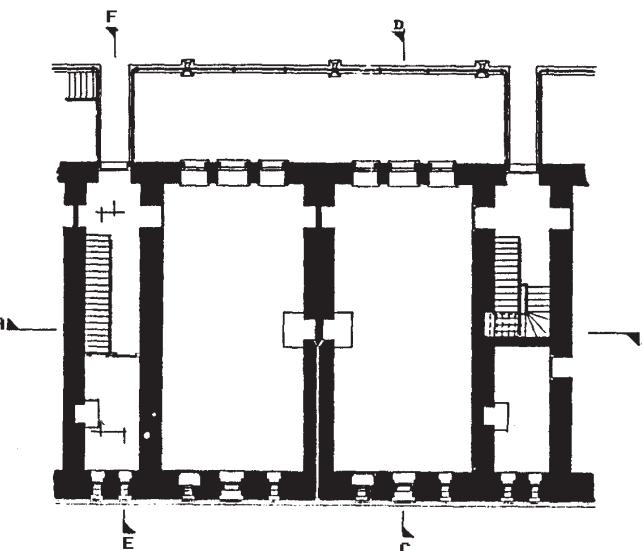
Section C - D



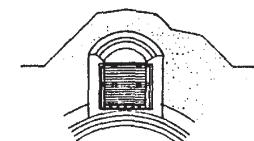
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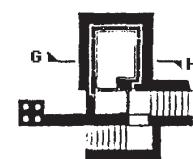
Lower plan



Upper plan



Section G - H



Plan of magazine

Widley and Southwick

The gorge defences of these two works are entirely different from the other three forts. A central barrack block of two storeys was provided but in place of the redan, two caponiers were constructed at either end. Embrasures were let in on all sides and the barrack was capable of limited defence against attack from inside the fort itself.

The upper and lower floors are generally similar in plan, with six barrack rooms for about 20 soldiers each. Staircases were sited between each pair of barrack rooms. The cookhouses, officers' servants quarters, sergeants' quarters, dispensary and storerooms were situated on the lower floors, with the officers' quarters and sergeants' mess on the upper floors. Additional rooms were set behind the gorge wall, and these served as married quarters for the men, as well as the usual guardroom, cells and stabling facilities.

Purbrook.

The gorge defences are generally similar to Nelson and Wallington, with a central redan but the barrack block is at a different level, with a basement similar to Widley and with the same kind of self-defensible arrangements of that fort, in place of the earth covering. The internal protection is of a higher standard throughout Purbrook and the passageway leading to the magazine was arranged in the form of a caponier with musketry loops, effectively dividing off the space behind the barrack block into two separate halves.

A further measure of internal protection was provided by means of chicanes in the passages from the main and demi-caponiers. These devices, which were counterweighted drawbridges let into the passageways were arranged so that when lowered they caused no obstruction. When raised, they blocked the entrance and revealed a pit some five to six feet in depth. Unfortunately the wooden doors have disappeared leaving a trap for the unwary. These features are unique to Purbrook on the Portsdown line, but are found in the Dover Western Heights defences and were provided in the now-demolished Isle of Grain fort.

Terreplein and Parade

The terreplein was designed to give the artillery the widest angle of fire over the countryside. Fire could cross with adjacent forts and would have given little cover to an advancing enemy. Ramps were provided to allow moveable artillery to be brought up to the firing

positions, those at Nelson were destroyed when the fort was altered in 1939 but they were reinstated by Hampshire County Council during restoration work. Expense magazines were constructed between each pair of gun emplacements, those on the flanks being fitted with extra protection, where they were vulnerable to reverse fire. As early as 1868 it was realised that the magazines were not properly protected from gun fire and the Committee of Enquiry recommended that they should not be used. At Purbrook, they were built at a lower level, the upper floor acting as a handling room. A look-out position and flag pole was fitted at the salient of the each fort.

In the mid-1870's, concrete emplacements were installed for the main armament on blocked-up mountings and D shaped pits at the salients for 'Moncrieff counterweight carriages. Two Haxo casemates for two guns each were fitted Nelson, the only Portsdown fort to be so equipped, although Fort Fareham has many of them.

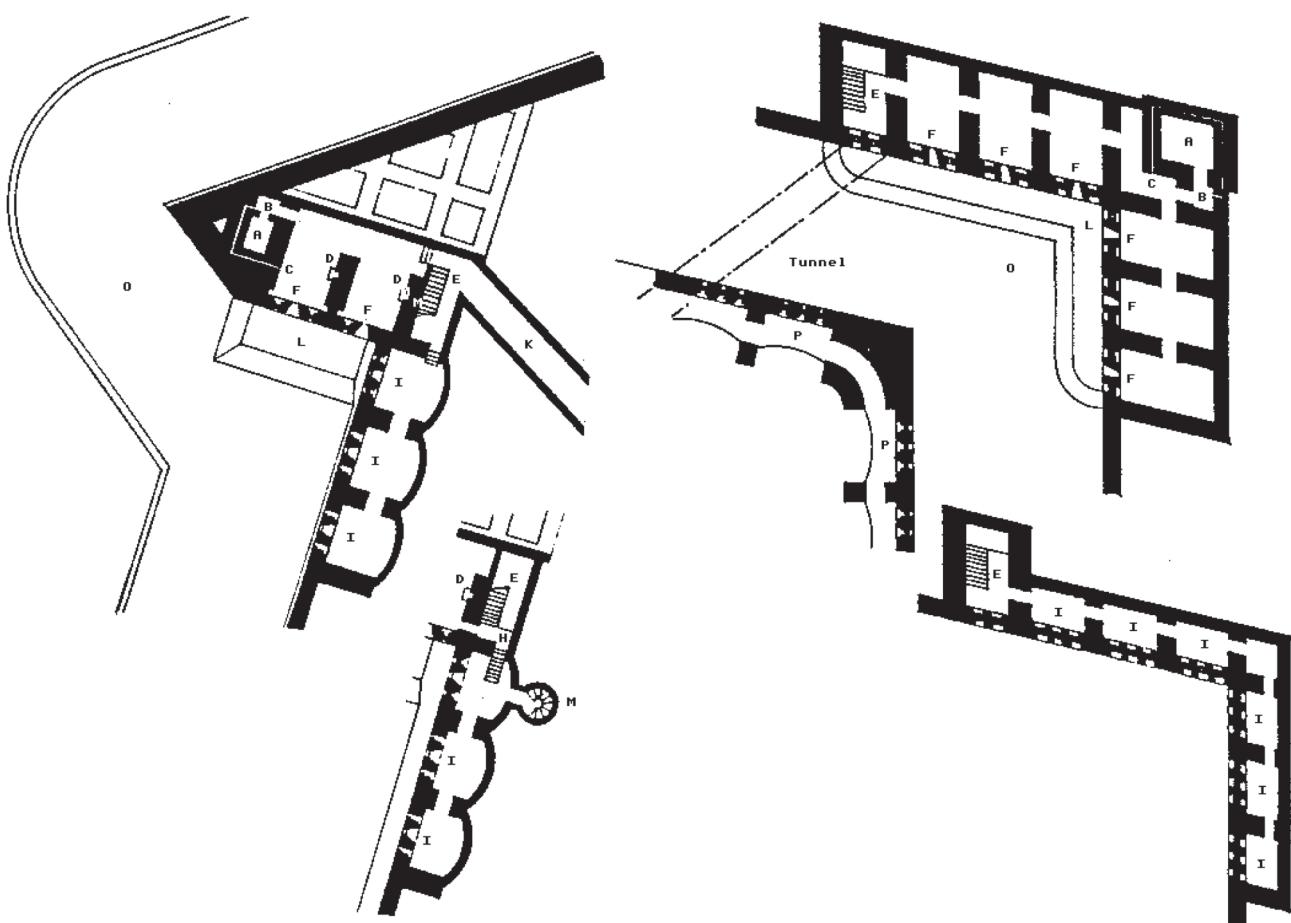
Caponiers

These structures were designed to cover the ditches of the forts against infantry attack, and formed a second line of defence. They were all of two storeys and had either embrasures facing in both directions or only in one, in which case they were termed demi-caponiers. They were arranged so that they could sweep the ditch with case shot or canister, supported by musketry fire and leave no 'dead' ground, where the enemy might take shelter. To this end, flanking galleries permitted the garrison to cover any piece of ground not directly covered by the caponier itself.

The main caponiers were built at the salient of each fort and covered two ditches one on each side. Small expense magazines were provided for immediate use and fireplaces gave some measure of warmth in winter. At Widley, Southwick and Purbrook, the caponier was further strengthened by a small musketry caponier, which completely blocked the ditch. The roof of this feature being brought up to a sharp angle, to prevent it being used by an enemy to cross the ditch.

The demi-caponiers were generally similar but covered only one ditch, the rear of the caponier being covered by the main caponier itself. In some cases posterns or sallyports gave the garrison the opportunity to take an invader from the rear, but could itself be a weak point and allow the attacker to gain access to the fort.

Detailed plans of West and North West Demi-caponier and the Counterscarp gallery at Fort Wallington



Key to all following drawings

- A Expense Magazine
- B Vestibule
- C Ventilation passage
- D Fireplace
- E Stairway

- F Embrasure for artillery
- G Trapdoor for hoisting gun
- H Steps up to gallery
- I Flanking gallery
- J Sallyport
- K Passage to interior of fort

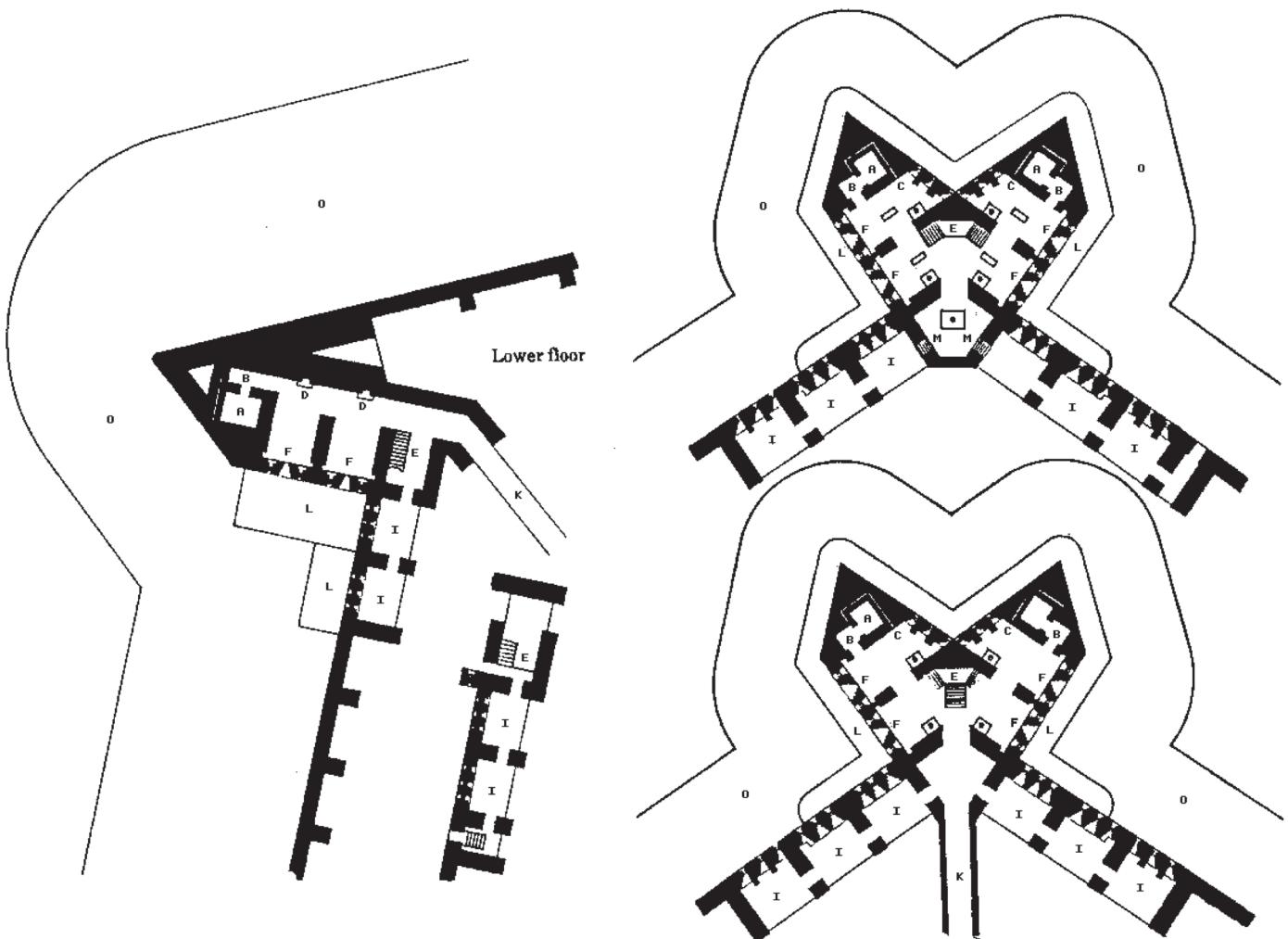
- L Drop ditch to protect caponier
- M Passage to mortar battery
- N Caponier musketry extension
- O Ditch
- P Scarp gallery

There are minor differences between all the forts on the line and there seems to have been no consistent policy towards allowing access from the caponiers to the interior of the fort. The general plan of the feature changed from the Gosport forts, with much more attention being paid to completely flanking all parts of the work.

At Wallington, the flanking galleries were exceptionally provided with artillery embrasures, an unusual feature and might reflect the vulnerability of the position. In

place of a main caponier, a counterscarp gallery was constructed, to cover the east and north ditches. To enable the garrison to man this work, a tunnel was driven through under the ditch, emerging inside the counterscarp wall to an 'L' shape set of casemates. Fire could be directed along each ditch without the necessity for a caponier, but although there was no access to the outside of the fort through the counterscarp gallery, there was always the danger of the enemy tunnelling his way through to the gallery and taking the fort itself.

Detailed plans of West demi-caponier and central caponier at Fort Nelson



Minor Ditch Defences

Some short lengths of ditches could not be seen from the caponiers and these were covered by small musketry flanking galleries or caponiers. These were not required at Wallington and Nelson but the other forts were fitted with two, three or four, as required by the trace of the fort. Steps would lead down from the nearest passageway to the musketry gallery and from here, the garrison could drive off any intruder that had dropped down into the ditch. In some instances, sally ports were added to allow sorties to be made.

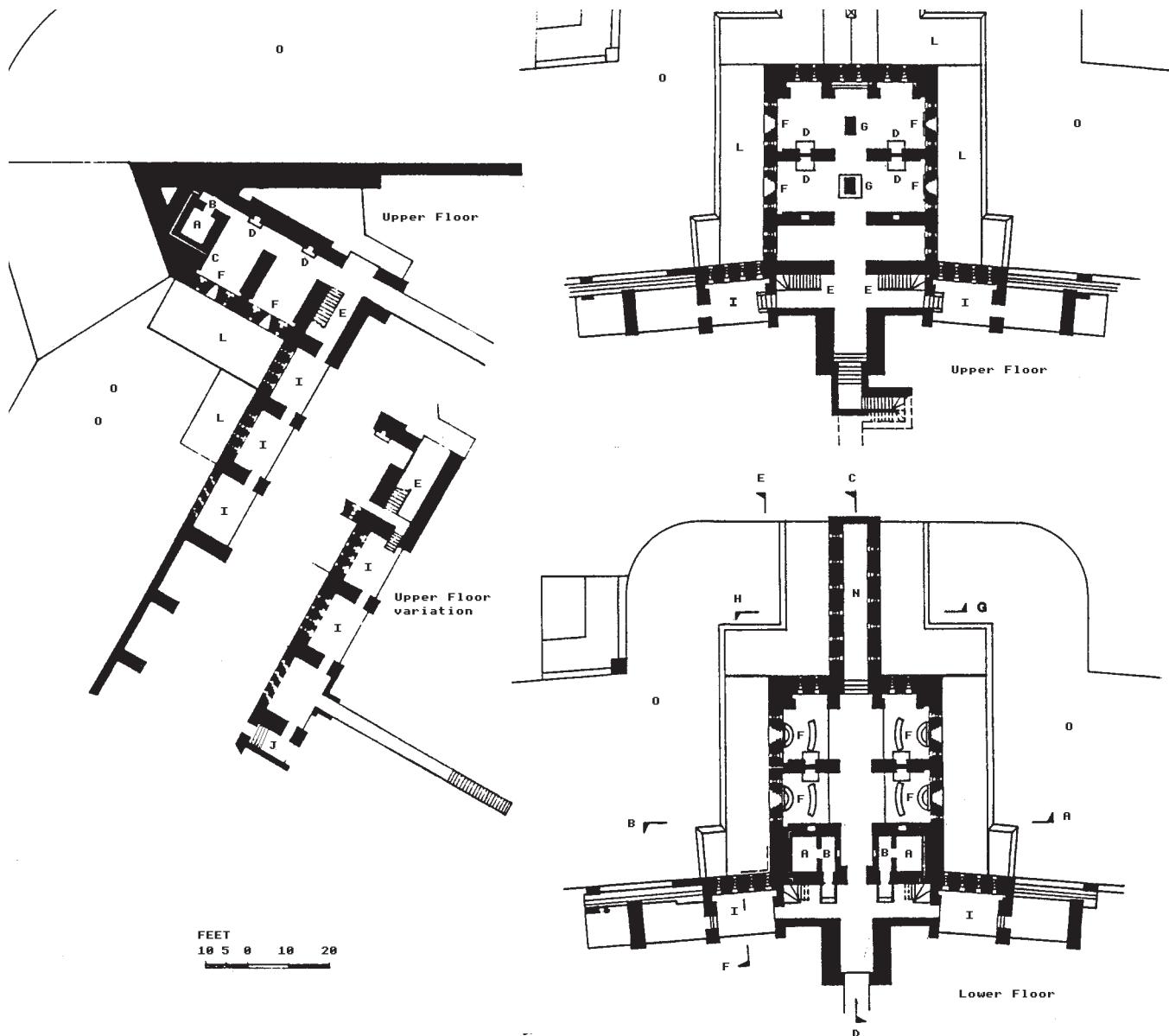
Main Magazines

With the exception of Wallington, where the nature of the ground prevented it, the main magazines were sunk

under the centre of the parade, with their crowns some 10 below the level of the ground. At Nelson, Southwick and Widley, there are two vaulted chambers opening off the north-south access tunnel, holding 2500-2600 barrels of black powder. A by-pass tunnel was driven through to isolate the magazine, some time after the completion of the fort and to improve magazine safety. The magazine at Purbrook is similar except that it connects with the central staircase and consequently does not need a by-pass tunnel, which is altogether a much safer arrangement.

All metal fittings were non-ferrous to prevent sparking and as no naked lights were allowed, a separate light passage was provided all round the magazine. From here

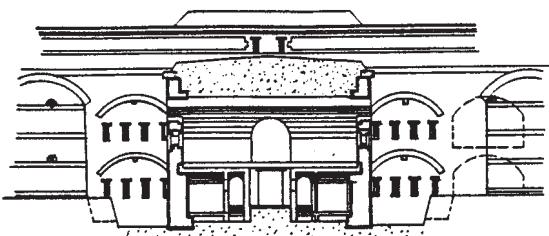
Detailed plans of West Demi-caponier and the central caponiers at Forts Widley and Southwick



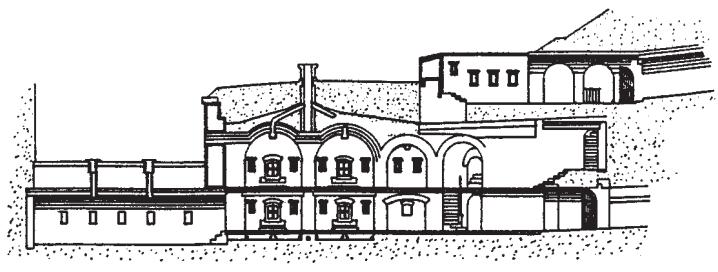
the oil lamps could be serviced and a measure of ventilation provided. The lamps were set in recesses and the light shone through glass windows into the magazine itself. Shifting and examination rooms were also provided. The flooring was originally of wood but this quickly rotted with the high levels of humidity and it was replaced with concrete. Wooden battens were fitted to the walls, to keep up a good circulation of air around the powder barrels. At Fort Nelson in 1939, the main

magazine was utilised for the storage of some of the anti-aircraft ammunition and electric fans were installed to give forced-draught ventilation. The conveyor belt which is in the access tunnel, together with the 60cm railway track on the surface, both date from the same period.

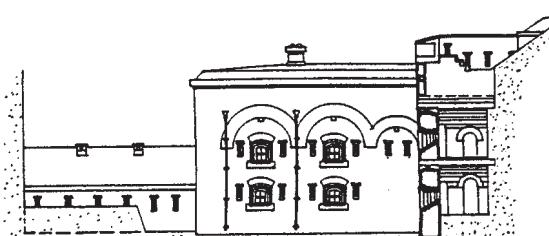
Sections and Elevations of the Central caponier at Forts Widley and Southwick



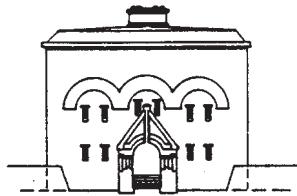
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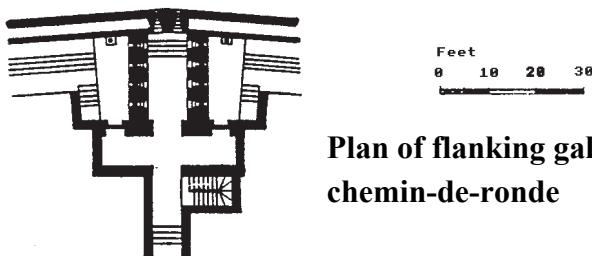
Section C - D



Section E - F



Section G - H



**Plan of flanking gallery on the
chemin-de-ronde**

Mortar Batteries

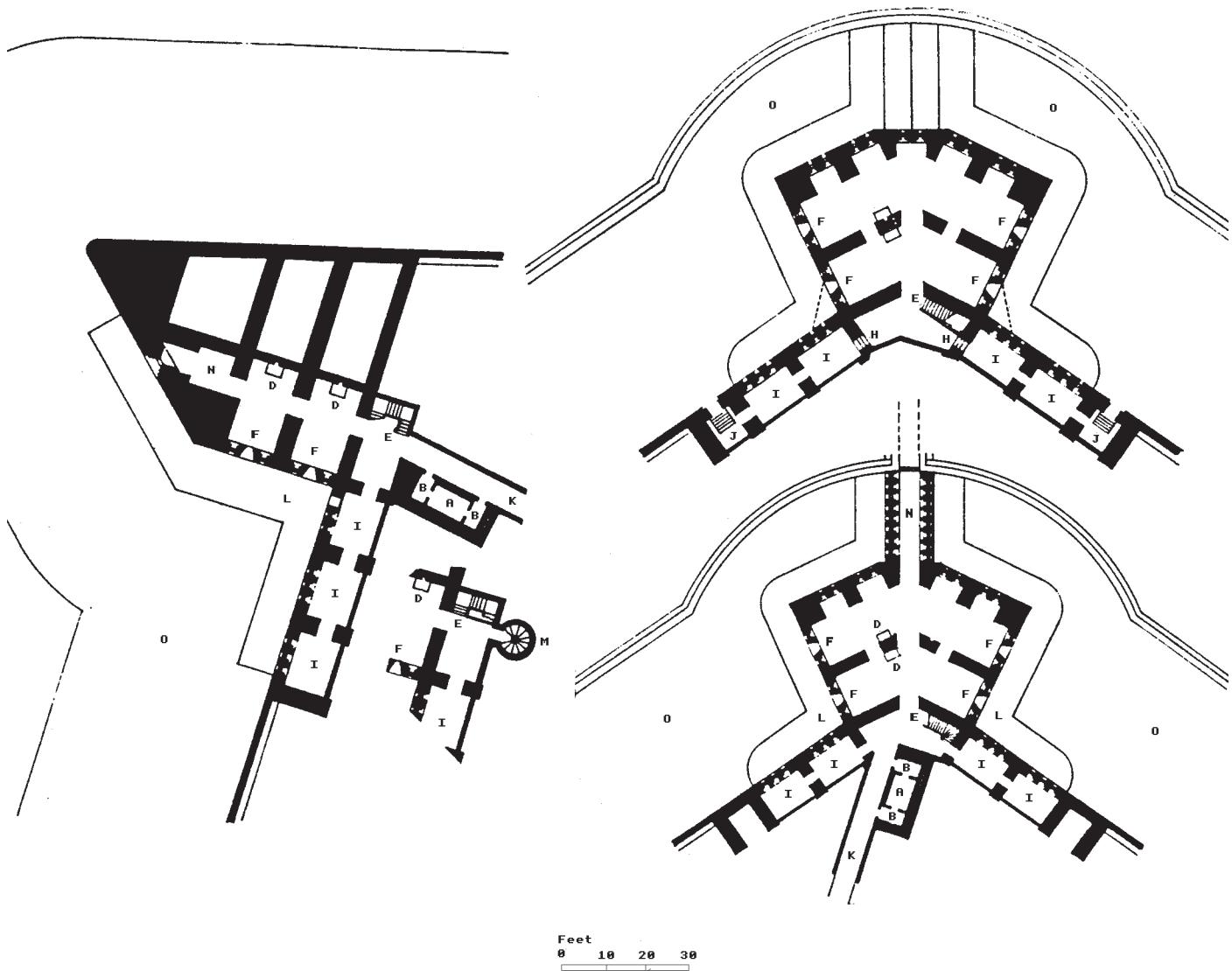
Casemates for mortars were constructed in all of the forts, at Wallington a single mortar battery for six guns was fitted to the north eastern angle, at Nelson, three batteries of three guns each, At Southwick and Widley there were two batteries of five mortars and at Purbrook, a single battery of five mortars, again in the north east angle. In all cases a passage runs behind the casemates and connects with the two flanking galleries on either side and to a passage leading onto the parade, where there is an expense magazine. At Purbrook and Nelson, circular stairs lead down form the rear of the battery to the passage from the caponier. At Widley and Southwick, a straight flight of steps lead down to the flanking galleries of the demi-caponiers.

Similar casemates were tested by the Royal Engineers at Fort Fareham, in conjunction with the Royal Artillery, in 1862 and this involved firing mortars of different sizes and observing the effect. It was found that reverberation was very bad, particularly with the heavier mortars and a number of modifications to the casemates were proposed. None of this work appears to have been carried out and there is no record of any mortars being fitted to any of the casemates. It would appear that the mortar batteries were abandoned soon after completion and instead, their role seems to have been taken over by RML howitzers fitted on the terreplein.

Chemin-des-Rondes

This feature, the sentry walk along the top of the scarp wall, contains a firing step and in most cases is accessed from flanking galleries above the caponiers at each end.

Detailed plans of the West Demi-caponier and the North East Caponier at Fort Purbrook



The Chemin-des-Rondes were designed to allow the defenders to fire on an enemy if he gained the top of the counterscarp, which is at a higher level. As the enemy came over the crest of the ridge, he could be picked off by riflemen firing from the sentry walk. The disadvantage was that if the enemy succeeded in crossing the ditch, he would use this to gain a foothold at the bottom of the rampart. To overcome this danger, the walkway was covered by flanking galleries, so positioned that they could command its entire length. The flanking galleries were originally open to the sky but this was later considered to be dangerous and in a number of cases they were roofed in, either permanently

or temporarily when under attack. At Purbrook, the walkway is broken up into two parts by a traverse, which is penetrated by a narrow passageway. The scarp wall is also taken up to over six feet in height with embrasures at intervals.

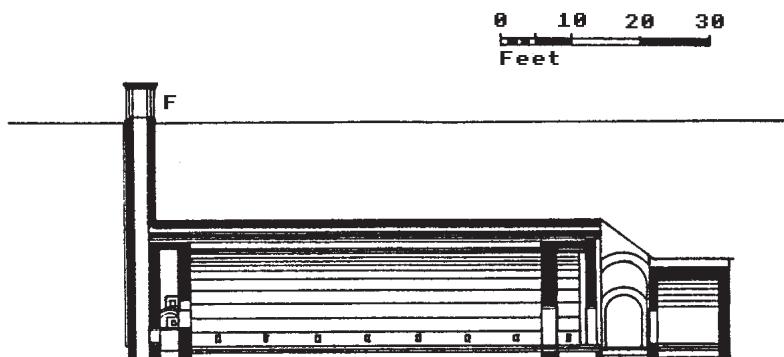
Drawbridges

Each fort was provided with two entrances in the gorge walls and protected by the redans. Embrasures being sited so that maximum fire could be directed at an enemy intending to force an entrance.

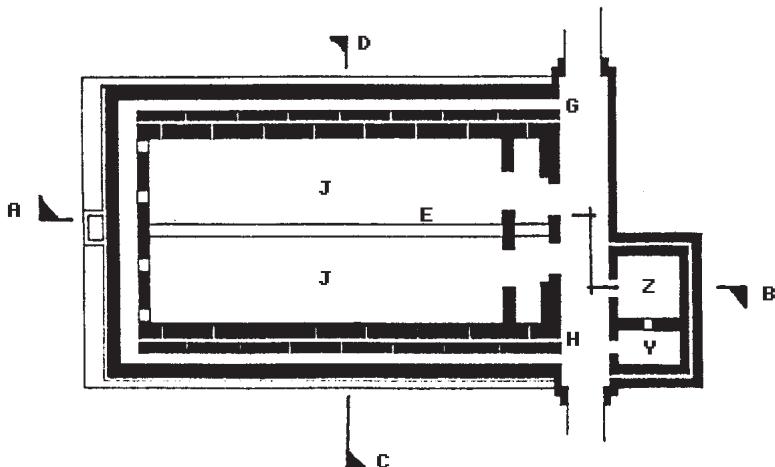
As a further measure of protection, drawbridges were fitted to enable the garrison to isolate the fort from the

Plans and sections of the main magazine at Fort Widley

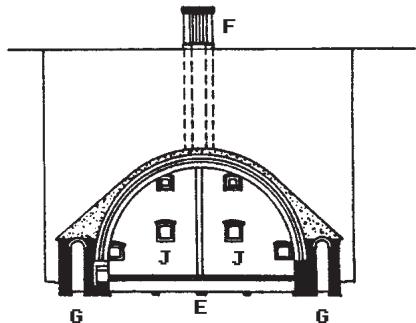
- E Diaphragm wall
- F Magazine ventilator
- G Lamp passage
- H Ventilation duct
- J Magazine
- Y Shifting room
- Z Examination room



Section A - B



Plan



Section C - D

outside world and to prevent an enemy attempting to batter down the gates. The bridge could be drawn back into the fort, revealing a pit some 12 to 15 feet deep and nearly 20 feet wide. The mechanism was entirely hand operated and was so arranged with counterbalances that the end of the bridge would not tip down into the pit, as it was being withdrawn into the fort. All the bridges were replaced as they were not strong enough for modern traffic, but excavations at Fort Nelson have revealed some of the workings of the bridge.

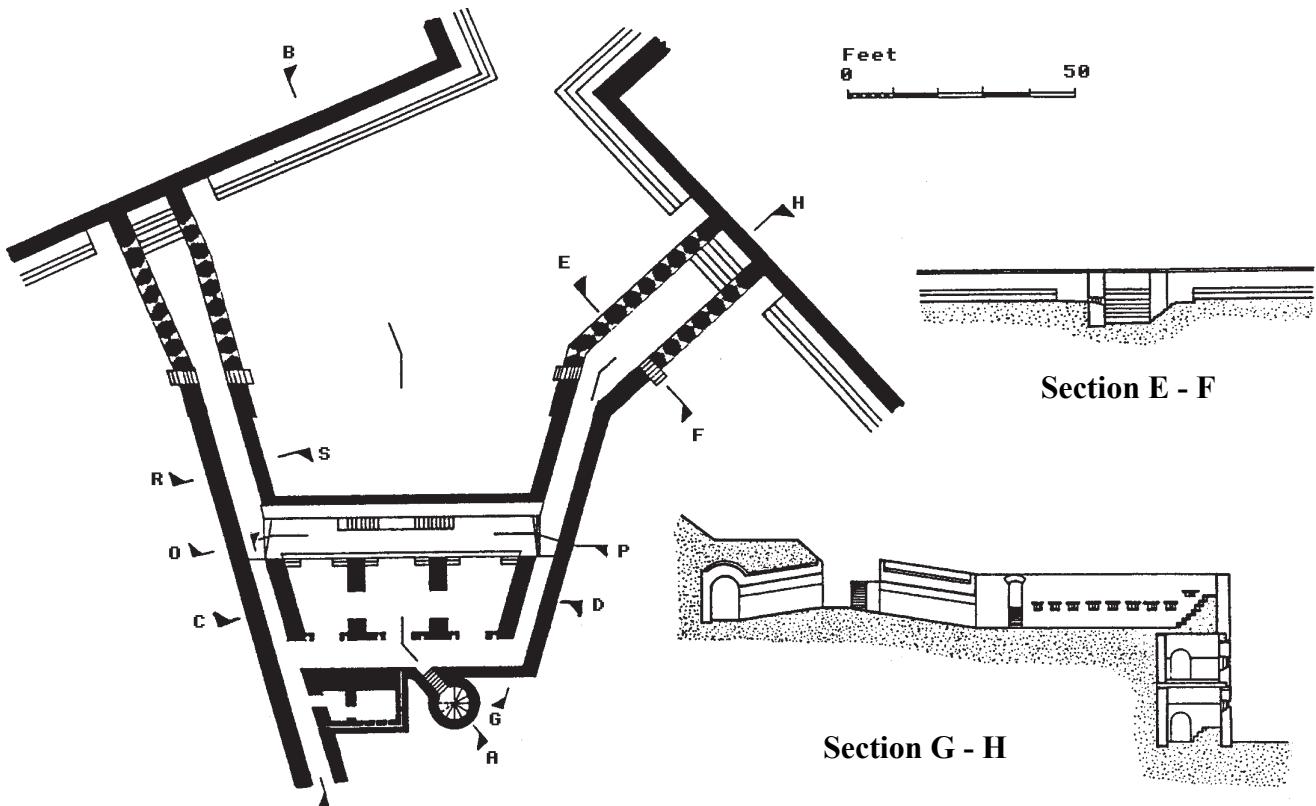
Armament

In 1860, when the forts were planned it had been intended to mount 30 guns on the terreplein of each work, with a further 48 guns for immediate defence. Each gun would have been fitted on a traversing carriage and slide, and would have been fired through an

embrasure cut in the parapet of the rampart, giving a lateral range of 30 degrees. By the time the forts were completed these positions were outdated and concrete emplacements were installed for 64pr RML guns mounted on blocked up carriages for firing over 6ft parapets. Other concrete emplacements were fitted for 7-inch RBL guns on Moncrieff counterweight disappearing carriages which permitted the guns to be loaded out of sight of the enemy.

The mortar batteries were now redundant and 6.3-inch or 6.6-inch howitzers on flat-bed mountings were fitted to cover vulnerable points.

**Plan and Sections of the North mortar battery
at Fort Nelson**



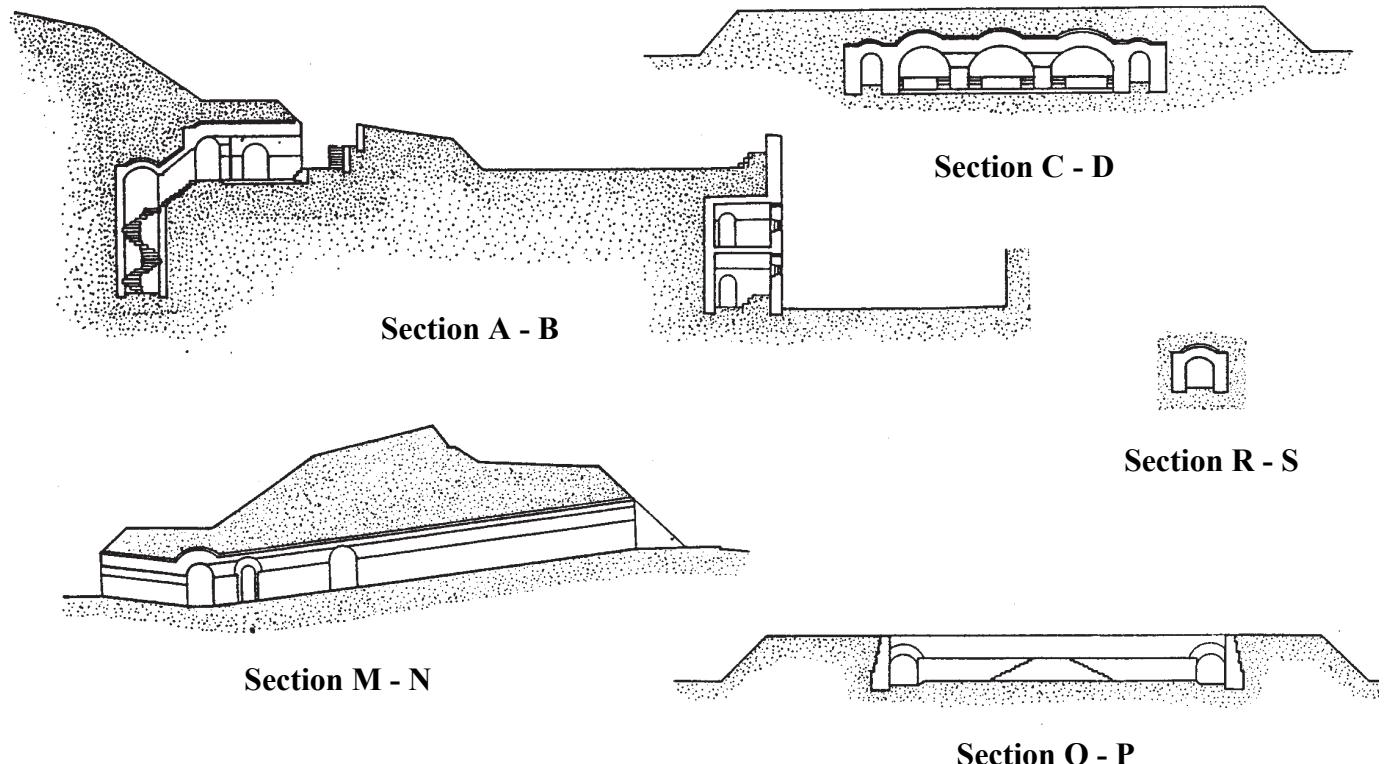
The flank defence was to consist of smooth-bore muzzle or breech loading guns, although light-calibre rifled breech loaders were also to be used. It was noted in July 1880, that the "Parapets of the Portsdown Hill forts have been prepared to receive the standing parts of their armament and the moveable portions are stored in the forts".

In July of the year following, since the 7-inch guns had not been mounted, it was proposed that 32-pounder RBL guns should be substituted for the armament on the upper floors of the barracks and redans for structural reasons. No action seems to have been taken however, and the Adjutant General, Royal Artillery, stated in October 1885, that "*the defences of the Portsdown Hill and the Hilsea Lines are, with the exception of Fort Widley, quite without ordnance*"

In July 1886, the lack of artillery appears to have been made good and nearly all of the forts are shown with some, if not all of their designed armament on site, if not actually mounted and for this work a sum of £13,250 was required.

Some years later in January 1892, the General Officer Commanding, Portsmouth, proposed that the beds and platforms of the 6.3-inch howitzers which formed part of the moveable armament of Gosport, three should be transferred to Fort Widley and one to Fort Nelson, as they were unsuitable for their original purpose. At the same time, he recommended that the six 32pounder guns should be transferred from Fort Southwick to Fort Widley and that six 40-pounder guns in store, should be mounted at the former. The work of arming the forts had still not been completed by January 1893, when the Defence Committee were asked to consider completing the fortifications. It was felt that if the forts were to be of any value, they would require re-arming and strengthening to withstand the impact of modern shells, or they would be virtual death-traps for the garrison, although examples of similar forts around Verdun, notably Fort Douaumont, survived terrific artillery bombardment during the First World War. Fixed defences were by now, out of favour and the rapid-fire of the machine gun made elaborate flank defence unnecessary. From 1902, the armament was gradually

Sections of the mortar battery at Fort Nelson



withdrawn and by 1904, only machine guns and mobile artillery remained. The main magazines continued to be used to store ammunition for siege batteries but apart from certain modifications made in the Second World War, the forts remain almost exactly as they were at the end of the nineteenth century.

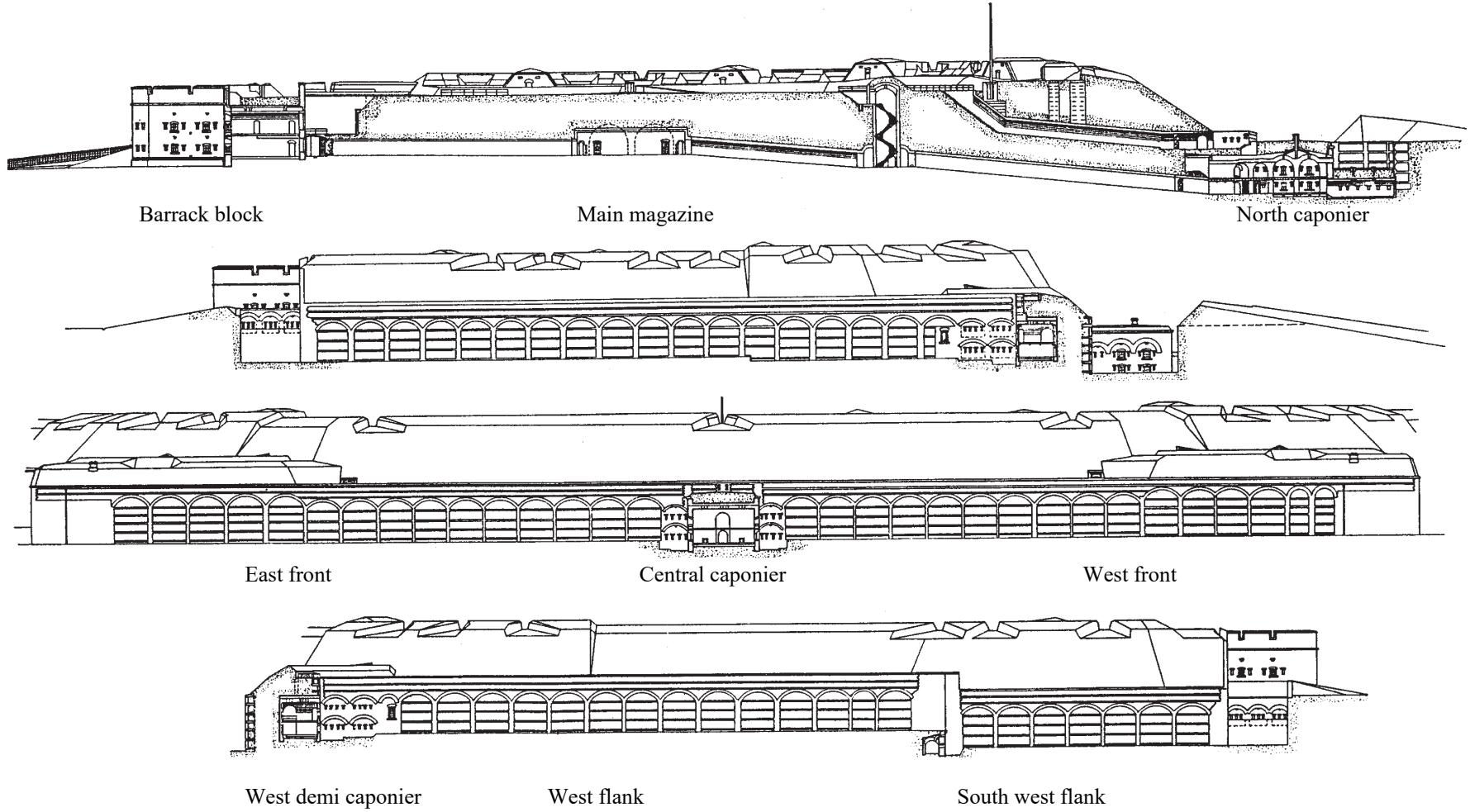
The ‘Moncrieff disappearing or counterweight carriage, allowed the gun to fire over the top of the parapet and yet allow the gunners to reload without being exposed to hostile fire. This was achieved by mounting the gun barrel on long arms, counterweighted so as to ensure that the gun was in a raised position. As the gun was fired, the force of recoil overcame the pull of the counterweights, and lowered the gun into its reloading position, where a ratchet mechanism prevented it from rising. The gun could then be swabbed out and reloaded before the ratchet was released and the gun returned to the firing position and the process repeated. Other arms kept the gun barrel horizontal, as it was lowered. A platform at the rear of the gun allowed the gun-layer to see over the parapet and direct the gun onto the target, mirror sights were fitted initially, but they may not have

been successful, as later mountings were shown with this feature absent.

Muzzle-loading or breech-loading guns could be fitted to this type of mounting and it is possible to identify which type would have been used by noting the position of the central pivot on the concrete emplacement, which was much further forward on the breech-loading version. Examples of the 32-pounder SBBL guns have been mounted in the central caponier at Fort Nelson.

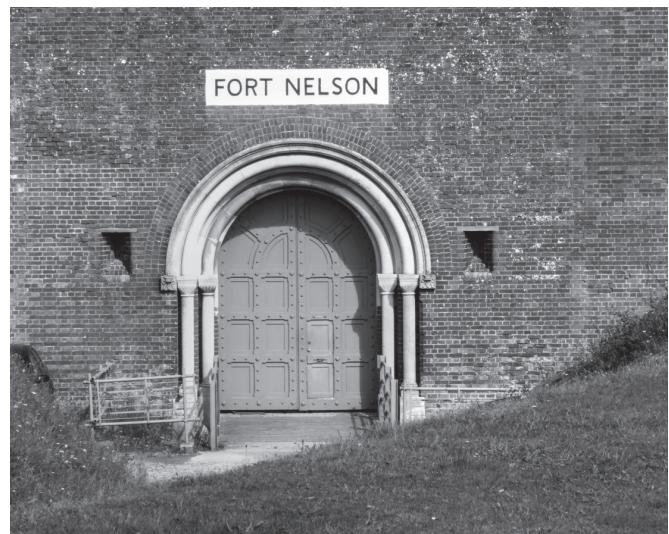
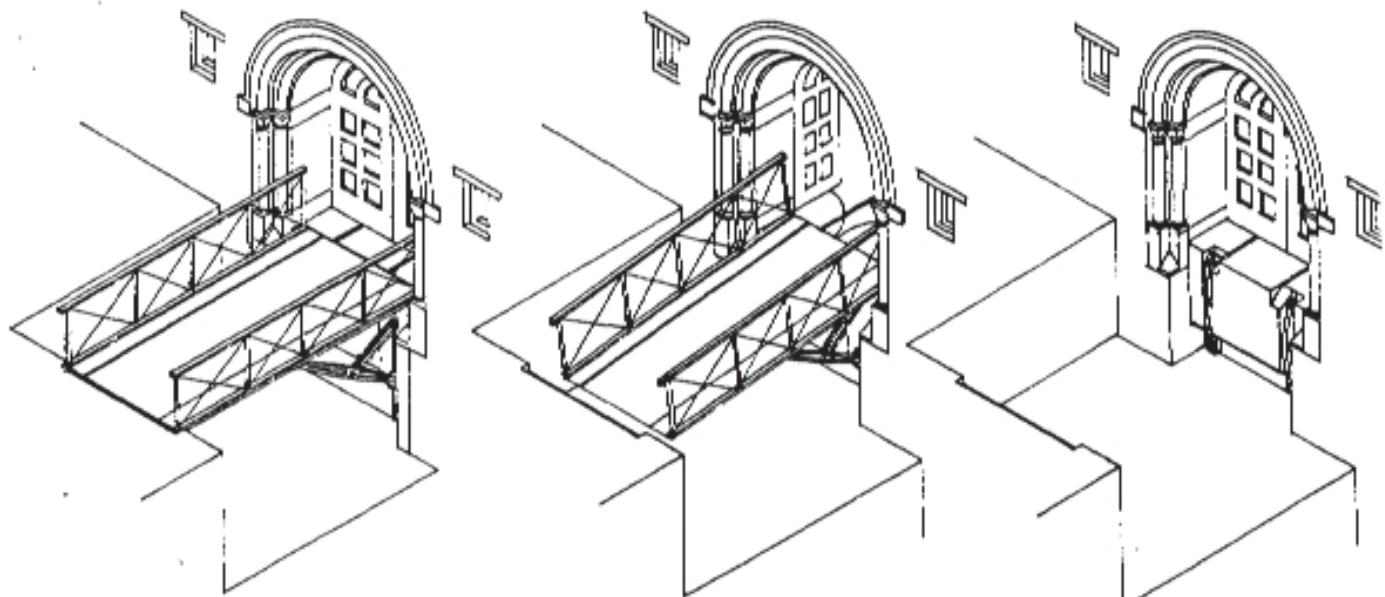


General Elevations and Sections of the Scarp at Fort Southwick



Western gateway at Fort Nelson with remains of Guthrie Rolling Bridge.

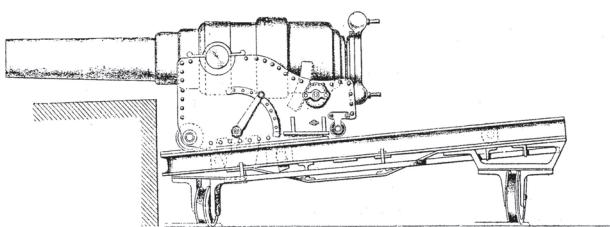
All of the forts on the Portsdown Line were fitted with this type of bridge

**Guthrie Rolling Bridge**

Bridge in closed position

Bridge being retracted
into the fort

Bridge fully open

**7-inch R.B.L.**

Calibre 7-inches

Barrel length 120 inches

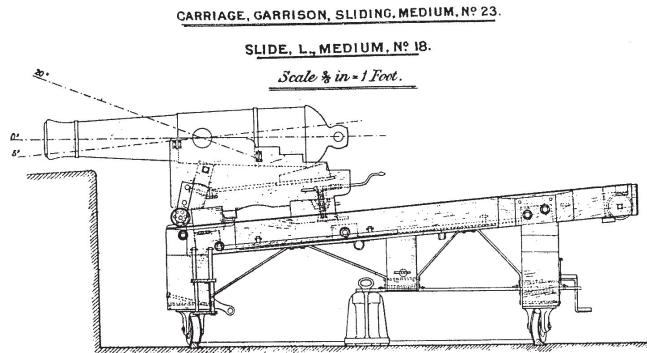
Rifling Polygrooved 1 turn in 37 calibres, 76 grooves

Weight of projectile 110lbs

Weight of charge 11lbs

Penetration of iron 5 inches at 1,000 yards

Muzzle velocity 1,100 ft per sec.

**64 pounder RML on traversing platform no.18**

Calibre 6.3 inches

Barrel length 148 inches

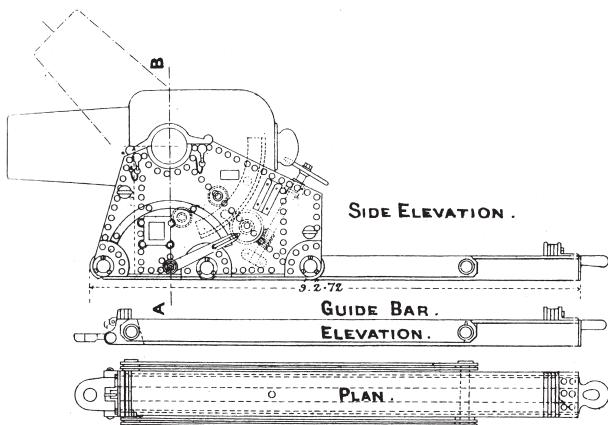
Rifling 3 grooves.

Weight of projectile 65 lbs common shell

Weight of charge 8½lbs

Range 4,000 yards

Muzzle velocity 1,260 f/sec.

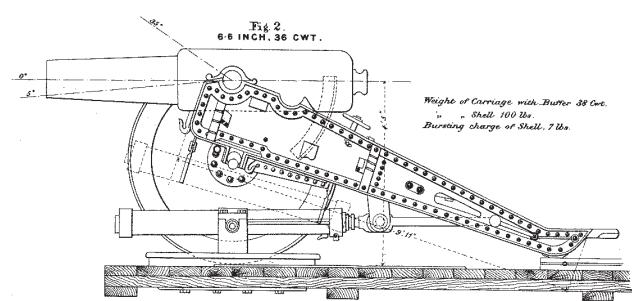
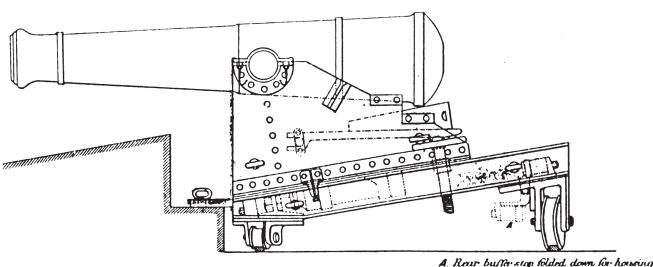
**6.6-inch R.M.L. Howitzer Mark I**

Barrel length 90.7-inches

Rifling polygrooved 20 grooves

Range 5,400 yards

Weight of projectile 100lb shrapnel

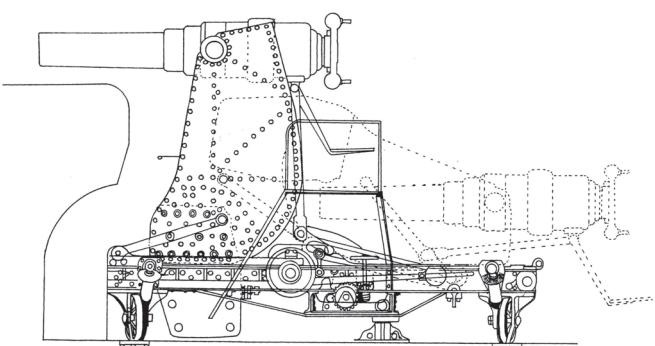
**Carriage Siege R.M.L. 6.6 inch Howitzer, Central Pivot mark I****32pr S.B.B.L.**

Barrel length 97.6-inches

Weight of projectile 55lbs

Weight of charge 3 lbs

Range 500 yards point blank

**Carriage, Garrison, Moncrieff, Disappearing, Pattern II for 7-inch Rifled Breech Loading Gun**

Glossary of Military terms

Bombproof A vaulted casemate or building covered with earth or concrete to withstand plunging shell fire.

Bore The inside of a gun barrel.

Breastwork Earth piled up in the form of a rampart.

Breech-loader A gun loaded from the rear or breech of a gun barrel.

Caponier A structure providing cross fire along a ditch.

Casemate A bombproof vault of brick or stone, usually covered with earth, which provided an emplacement for a gun or living quarters for soldiers.

Case shot A cylinder of thin metal filled with cast-iron shot and fired from a gun as an anti-personnel measure.

Chicane A drawbridge placed in a passageway to prevent the interior of the fort from being overrun.

Counterscarp The side of a ditch furthest from the fort, to provide flanking fire.

Counterscarp gallery A defensive work let into the counterscarp wall of a fort, to provide flanking fire.

Embrasure Opening in parapet or casemate front through which cannon could be fired.

Enceinte The space enclosed by the fort.

En decharge A wall built with arches and buttresses and behind which, the earth is allowed to fall at a natural slope.

Enfilade Fire directed from the flank of a fort so that projectiles will rake the length of a rampart without the garrison being able to reply.

Escarp or Scarp The side of the ditch nearest the fort.

Expense magazine A small magazine in which ready-to-use ammunition was stored near the guns.

Flanking fire Fire directed at the side of an attacker.

Flanking Gallery A passageway with embrasures to provide fire along a length of wall or ditch.

Fraises Horizontal palisades erected around the earthwork of a fort to help repel attackers.

Glacis A sloping earth bank in front of the walls of a fort.

Gorge The rear face of a fortification.

Haxo casemate A gun emplacement covered with a bombproof cover but open at the rear.

Keep of last resort A place to which the garrison may retire if the main fort is overrun by the enemy.

Muzzle-loader Any gun loaded from its front (muzzle) end.

Outwork A defensive work outside the main fort.

Parados Rampart protecting the rear of a fortification.

Parapet The portion of the rampart for protecting the defenders, over which a gun is fired.

Racer track Curved iron track set in the ground on which a gun is traversed.

Rampart Fortified embankment topped by a parapet.

Redan A detached work in a ditch of a fort or a projection at the rear of a fort.

Redoubt A detached work without flanking fire or a small fort.

Revetment The brickwork or masonry facing to an embankment.

R.B.L. Rifled Breech-loading gun.

Rifled gun A gun whose bore was cut along its axis with spiral grooves so as to spin an elongated shell and make its flight more accurate.

R.M.L. Rifled Muzzle-loading gun.

S.B. Smooth Bore gun

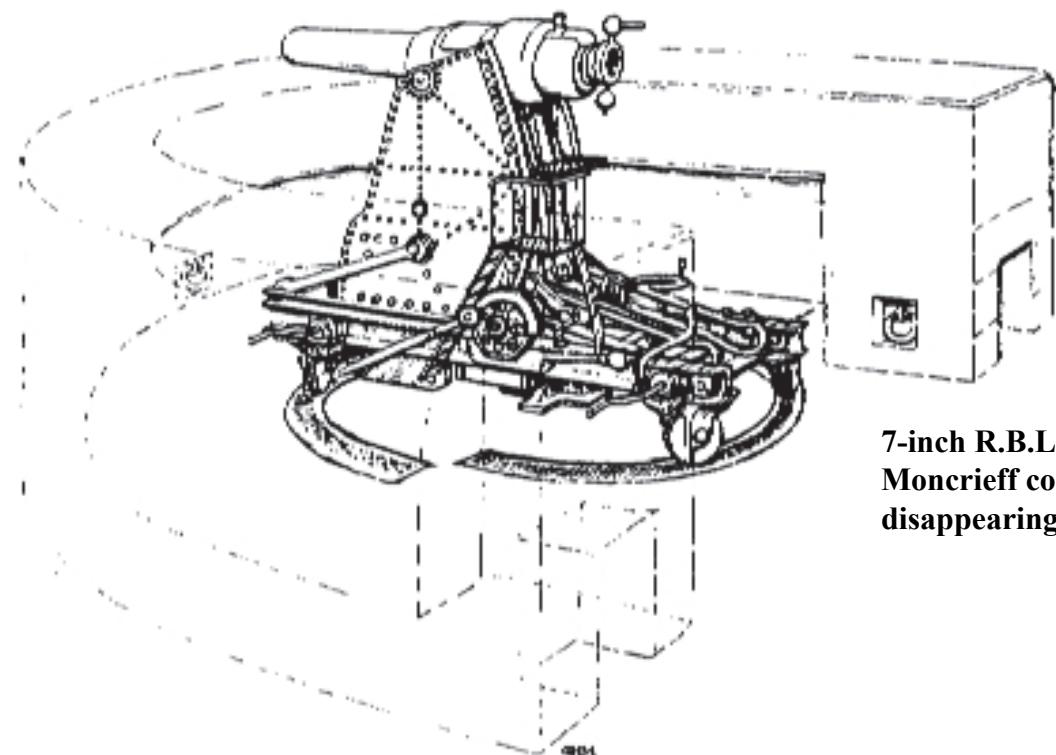
Talus The sloping part of a wall, thicker at the base.

Terreplein Broad level fighting platform on the rampart behind the parapet.

Trace The outline plan of a fort.

Traverse (1) To swivel a gun and its carriage, usually to point them at a target. **(2)** An earth bank positioned so as to protect troops from enfilade fire or to minimise the effect of & bursting shell.

Traversing platform Wooden or metal platform which supported a gun and its carriage end which could be traversed on racer track.



7-inch R.B.L. on
Moncrieff counterweight
disappearing mounting

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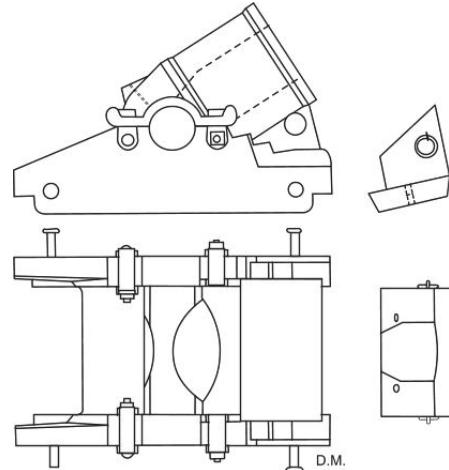
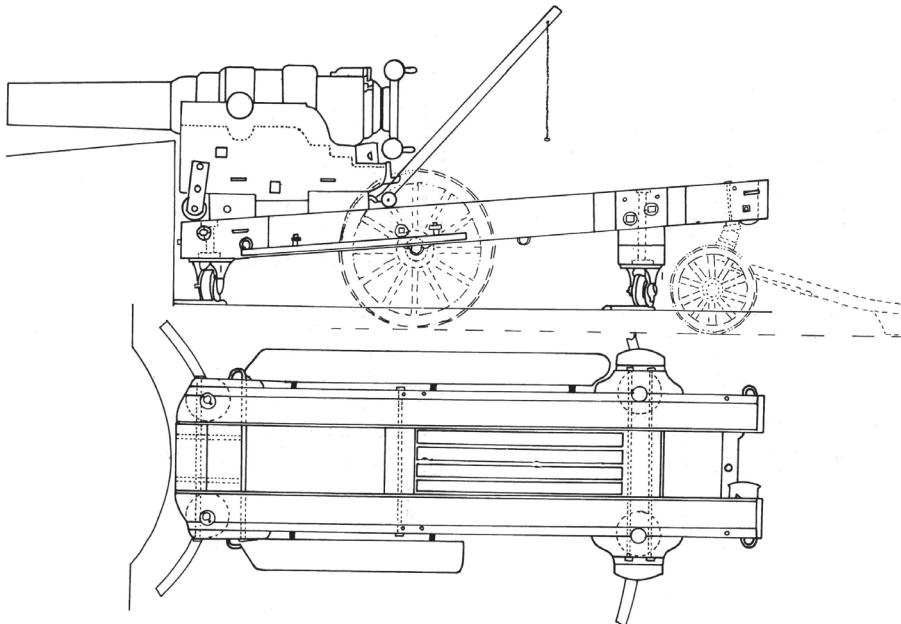
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Above: 13inch Mortar
Left: 7-inch R.B.L.



Above: Fort Wallington West entrance and gorge

Left: Fort Southwick West entrance and gorge

Below Left: Fort Southwick 64 pr gun emplacement

Below Right: Fort Southwick West caponier

Bottom: Fort Southwick barrack block





Above and Right: Fort Purbrook barrack block

Right: Fort Purbrook north caponier

Below: Fort Purbrook redan courtyard

Bottom Left: Fort Widley north caponier

Bottom Right: Fort Widley barrack block

